The Builder.

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*The Design and Construction of Harbours.**

EVER since the successful erection, in 1810, of that remarkable work the Bell Rock Lighthouse, the name of Stevenson has been as intimately associated in the public mind with what may be termed "civil marine engineering" as that of the similar but differently spelt name with railway engineering. There is, we believe, a saying that a banking-house never lasts for more than three generations. A frugal, hardworking man, taught in the painful school of adversity, founds a house which is often dilapidated by his children, who are brought up to look at life through fine carriage windows. Successive alternate upper middle-class generations often vibrate like a pendulum between wealth and poverty. A similar observation can be made with regard to manufacturing mechanical engineers who, if at all successful, generally accumulate much wealth. It is but seldom that the second or third generation continues a difficult business of this kind with the same success as the original founder. Civil engineers who, as a rule, do not undertake contracts, do not—generally, at least,—accumulate so much wealth. Their descendants, free from the allurements of too much pudding, and naturally attracted by the interesting nature of the work, generally follow the family profession. Even on the supposition that there be only average abilities to start with, the aid and counsel of the parent directing the education, tastes, and first start in life of the son, or near relation, generally ensure success, if only acting in combination with fair conduct. And then, as the Germans say, "*Wem Gott ein Amt gibt, dem gibt er auch Verstand;*" and early practice, even if it do not make perfect, certainly gives a long start in the race of life. We may thus now see many successful civil engineers whose profession has been an heirloom in their families ever since there was such a thing as engineering.

But even without this being the case in the source of the work now before us, as we always look upon it as a good thing when practical men write about their practice, we should regard this book with pleasure. We hold it to show almost a want of principle, at any rate a narrow selfishness, that men engaged in large and important scientific undertakings should not put some of their store of knowledge on record for the use of others and other generations. It is a great loss, a loss even in material wealth, when a man of this kind is gathered to his fathers without having recorded some of the knowledge he has gained. His ground has perhaps to be gone over again by others, at great expense of time and money, causing losses that can scarcely be directly or indirectly estimated. We are now thinking of more than one engineer who has illiberally kept to himself the result of expensive experiments. But this reproach cannot be addressed to the builder of the Bell Rock Light-house, nor to Messrs. T. & A. Stevenson, who have worthily done, in this and more practical ways, what we think is a duty to the country. Several excellent works have proceeded from their pens, amongst which we may mention the rudimentary treatise on light-houses, by Mr. Alan Stevenson, and a work on lighthouse illumination by Mr. Thomas Stevenson. The book now before us is by the last gentleman. It is substantially a reprint, but with many additions, of the article on harbours in the "Encyclopædia Britannica." It is stated by the author that the late Professor Hosking intended to republish that article, in company with others from the "Encyclopædia," "as an independent treatise on civil engineering and the constructive sciences," but, owing to the death of the professor, that project was given up, and Mr. Stevenson now publishes the article by itself, and in an improved form. The work begins by a classification of the different kinds of harbours into "either havens for the protection of ships during storms, or as ports for commercial purposes." The difficulties to be encountered by the engineer may be said to generally increase with the size of the works he undertakes. At any rate, there is much more disaster through any false step. For this reason, there is a much smaller field for ingenuity, and a greater demand for judgment, as one advances from the designing and construction of small machines, towards those of larger engines, and to the still larger constructive works. Designing harbours is one of the most difficult branches. It would be impossible, in searching for precedents of work, to find perfect identity in the physical peculiarities of different places. One has to inquire as to the most economical design, sufficient for the class of shipping to be accommodated—exterior works,—and suitable to the local requirements of the station—interior works. Mr. Stevenson does not enter much into details as to the inner works of harbours, "as from their situation they are necessarily protected from heavy seas, and are consequently more nearly of the same character at different harbours than the exterior works, the nature of which must vary more or less with every locality."

The exterior works of harbours are classified under:—Harbours of refuge and anchorage, breakwaters, deep-water and tidal harbours for commercial purposes, canted or curved piers, straight piers, and quays or wharfs. The various conditions determining the general character of the works are, the kind of shelter of the situation; the action of the waves with regard to the situation; whether it is necessary to protect the berthage by means of a curved or a canted pier; whether it is necessary to inclose the space of water between two piers inclined to each other; and whether recourse must be had to a "compound harbour," or one harbour within another, in which "the outside waves are first reduced by expansion into the area of the outer or stilling harbour." After settling the general character of the works, the details adapted to the local characteristics have next to be considered. The work is thus devoted to an examination of the detail questions affecting the construction of harbours, such as the geological features of the shore, its exposure, the local force of the waves, the range of the tides, the depth of water, the proximity of deep water to the pier itself, and the angle made by the coast-line with the direction whence arrive the heaviest waves. Mr. Stevenson draws the important inference, from his own observations and those of others, that in exposed situations mud cannot repose near the surface, and that, therefore, if "we find in front of a proposed harbour that mud reposes within a few fathoms of the surface, we have in that fact certain ground for concluding that our works will never be assailed by a very heavy sea." As the substance of his article on the generation of waves, he considers that "the most exposed coasts may therefore be regarded, *cæteris paribus*, as those on which the waves generated in the line of maximum exposure come dead upon the shore." Smeaton is here quoted as placing the force of the waves as "subject to no calculation;" and Mr. Stevenson endeavours to form a more accurate estimation of those forces thus designated by "our greatest marine engineer." As showing the enormous power of the waves of the sea may be cited the instance that at Bishop Rock Lighthouse, "a bell was broken from its attachments during a gale in the winter of 1860, and at Uist a door was broken open, at a height of 195 ft. above the sea." Blocks of 50 tons weight have been moved by the sea at Barrahead, one of the Hebrides. The ultimate strength of any sea-works must be in a great measure determined by the actual local force of the waves, and the importance is clear of measuring this force in order to obtain a point of departure. Mr. Stevenson has used for this purpose a marine dynamometer, consisting of a cast-iron cylinder bolted to the rock where the experiments are to be made. Within the cylinder is attached a strong steel spring, abutting against a number of rods sliding in the cylinder. To these rods is fixed a disc against which the waves impinge, and communicate motion to the rods by compressing the spring. Rings of leather slide on the guide rods, and indicate how far the rods have been pushed back. With such instruments, more or less modified to suit special circumstances, Mr. Stevenson has made a large number of observations, dating from 1843. He thus, January 12th, 1848, found that a very heavy swell exerted a force of no less than 5,032 lb. to the square foot.

The use of these instruments was attended with certain difficulties,—leaving alone some complications in their construction. In the first place, it was not found desirable to select a site for the observations on a very low level, "as it has not unfrequently happened, during a gale, that for days together no one could approach the dynamometer to read off the result, and to readjust the indices to zero." The use of a heavy spring is also attended with the objections that, without subsequently testing it, we could not be certain that it had not taken a permanent set. In 1858, the author made a series of experiments at Dunbar, which were continued till the completion of the new sea-wall, in order to ascertain the relative forces exerted by the waves at different levels. The various dynamometers attached to the old *curved* sea-wall had necessarily to be sunk nearly flush with the masonry. In order to check the indication of the leather rings, holes were made in the under-side of the rod, and filled with small shot, which were expected to drop out when the rod was pushed so far out as to leave them unsupported. This plan did not answer, and the use of a cylinder of wax, to be scratched by a pin, was proposed by a friend of the author. It seems to us that a certainly simpler, and probably more efficient, marine dynamometer might be made for these important purposes. It could consist of a bored out cylinder fitted with a plunger, attached to the disc intended to receive the impact of the waves. Behind the plunger, and filling the portion of the cylinder behind the plunger, would be water, and the piston could be kept tight by means of an elastic diaphragm, attached to the piston itself, and to a cover at the back, thus forming the two joints. The water could then communicate with a metallic gauge, such as Bourdon's or Schaefer's. The pressure given to the water would thus be indicated by the hand of the gauge, which could be made self-registering, as is often the case with metallic hydraulic gauges. This instrument would have another great advantage, inasmuch

* The Design and Construction of Harbours. By Thomas Stevenson, F.R.S.E. Reprinted and enlarged from the article "Harbours," in the eighth edition of the "Encyclopædia Britannica." Edinburgh: Adam & Charles Black. 1864.

as the movements of the index could be seen from afar by means of a telescope, while the maximum results could be recorded by the fixed hand. It is scarcely possible to prognosticate in advance the efficiency of anything of this kind, but our idea is perhaps worth the consideration of Mr. Stevenson.

The true cause of such dangerous breaking waters as the Bore of Duncansby, and the Merry Men of Mey in the Pentland Firth, is given to be "the swell of the ocean encountering an opposing tidal current." Mr. Scott Russell's, statement, that "he has never noticed a wave so much as 10 ft. high in 10 ft. water, nor so much as 20 ft. high in 20 ft. water, nor 30 ft. high in 5 fathoms water; but he has seen waves approach very nearly to those limits," is here quoted with approval. The depth of water for some distance in front of a work may thus be said "to be the ruling element which determines the amount of force which it has to resist." The waves exert their destructive influence by the propagation of vibrations, by the direct influence of the fluid on the back joints of the face stone of the quay, by the sudden condensations and expansions of air in the hearting, and by the hydrostatic pressure of the water which may be forced through the seawall. Very curious instances are cited of damage resulting from rarefaction of the air outside the masonry, produced by the sudden back-draught caused by the relapse of a heavy wave after it has broken against a structure. The entrance-door of the Eddystone Lighthouse has thus been driven outwards,—though secured against the outside by strong bolts—by the atmospheric pressure acting from the inside of the tower. Stones are thus found to suddenly start from the faces of sea-walls from this cause. The great importance of a high specific gravity in the quarries to be used for harbour purposes, has led Mr. Stevenson to give a table of the specific gravities of different kinds of rock. He obtained the amounts very expeditiously by means of a spring balance, from which was suspended the specimen, the reading noted, and after being immersed in water, the diminished weight is again noted. We should say that the spring itself should be occasionally tested, in order to be certain that its elasticity had not been affected.

The great importance of a high specific gravity in the materials for sea-works, is clearly shown further on in a comparison between the requirements of sea and land architecture. The perfection of marine masonry would be attained in the construction of a pier so that, "on the abstraction of a stone at the bottom, the whole vertical section of masonry should at once sink so as to fill up the void." The lower courses would then be kept in place by the unreduced weight of the upper portions. In land architecture just the contrary is obtained, and some of the lower stones of a wall may often be pulled out without endangering the structure.

As showing the necessity of a good "loose," or point of departure, in a harbour, the digest of 266 wrecks, taken from the Harbour of Refuge Commission report, is here given. The table proves that more than one-fifth of the whole took place on either entering or leaving the port; and if to this be added the vessels damaged on piers through insufficiency of the ropes, it is seen that some of the greater perils of the sea have actually to be encountered in or near the port. In the article on docks an inquiring mind may learn "what is a graving dock;" and we hope that Lord Robert Cecil will take an early opportunity to call the attention of his parliamentary friend to this source of information. Those who wish to dive deeper will find an excellent comparison between the relative advantages of slips and graving docks. We find here a contradiction to the general statement that the *teredo navalis* is of recent appearance on our shores. It appears that they were unpleasantly known in Scotland upwards of 300 years ago, and that "they were then firmly believed to be young sea-fowl, of the kind called *klaiks*. Mr. D. Stevenson has directed attention to the fact that woody fibre is eaten by the worm, though the outer skin had been protected by creosoting. "At Scrabster, Leith, Invergordon, and other places, where the timber was thoroughly creosoted, it has been very much destroyed by the worm." In other places, however, this has not been found the case.

One of the most important and interesting problems of the day, involving vast interests, is the question as to the durability of cast and wrought iron when in contact with sea-water. Mr. Stevenson thinks that, "where there is room for choice, neither cast nor malleable iron should be used as a *principal* constituent of sea-works which are to be so deeply submerged as to become difficult of inspection or repair." There is much too little recorded experiment on this question. From an examination of a cannon-ball, probably about three centuries old, Mr. Stevenson concludes that upwards of $\frac{3}{4}$ of an inch in a ball $4\frac{1}{2}$ inches in diameter, are oxidised within a century, the material being placed so as to be alternately wet and dry. According to Mr. Mallet's experiments on cast-iron immersed in clear salt water, only from 1-10th to 4-10ths in depth, in castings 1 in. thick, would be destroyed in a century. Mr. T. Stevenson has made some remarkable observations on certain cast-iron gratings fixed to the Bell Rock Lighthouse, completed in 1810 by Mr. R. Stevenson. "Many of these gratings, which are not constantly immerged, are now decayed in different places, cavities having been found fully half an inch deep; thus giving 1 in. to the century for castings 1 in. square." The important circumstance was observed that the decay is very much confined to parts where there have been air-holes. Once the water gained access to these holes it would be retained, and the effects of constant immersion would be locally produced. This points to the especial importance of avoiding blow-holes in castings exposed to the action of sea-water, as also to the necessity for the absence of any hollows in which the water might lodge. But, even with an originally perfectly sound casting, Mr. Stevenson found its specific gravity was reduced to 5·63, and its transverse strength from 7,409 to 4,797 lb., without showing any external appearance of decay. Another apparently sound casting was found to have lost nearly half its strength in about fifty years. Iron in the form of borings, mixed with gravel to form a concrete, bids fair to be of great use. It has been introduced by Mr. Leslie at the Stanraer pier; and a careful account of the composition and application of this concrete is given in a letter from the resident engineer of those works. This is clearly, in its way, an application of the old "rust joint" used from the beginning for steam-joints, and for the composition of which such minute directions were given by Watt. After two months and a half only, the layers of borings used at Stanraer were found caked into a hard mass, and particles of gravel were seen adhering to the sides of the layers, thus showing that the concretionary influence of the borings is extending, and will in all probability, in course of time, completely bind the intervening layers of gravel." The gravel was also found very strongly coloured. The last chapter is on miscellaneous subjects relating to harbours; such as the deposits of silt, the movement of heavy shingle by the surf, the shoaling of natural bays, the cause of inclosed harbours keeping open, the efficiency of back-water scouring, artificial scouring, the duration of scouring, the effective velocities of currents, dredging, dredging in exposed situations, the removal of silt by pumping. A proposition here examined is that the commercial value of harbours or rivers probably increases as the cubes of the depths of water. An interesting diagram of the height of the waves at Lybster Harbour is given for the purpose of graphically showing the suddenness of the gales visiting our eastern coasts, as also the comparative eligibility of the summer and winter months for carrying on marine works. The highest waves are those in November and December, and the lowest from May to October. Lighthouses are next briefly treated on. A suggestion by the author that gas-pipes ought to be laid out "to any inaccessible place, the position of which required to be marked by night," is carried out on the Clyde, near Port Glasgow. The gas, kept constantly burning, is raised and lowered as required by means of stopcocks on the shore. Suspension piers, Mr. Mitchell's screw piles and screw moorings, fenders, moving hauls, are briefly described, and the advantages of two entrances to a harbour are briefly set forth. The Bill brought into Parliament by the President of the Board of Trade, and passed, for granting for the construction of harbours, loans not in any one case exceeding 100,000*l.*, at the rate of $3\frac{1}{4}$ per cent., appears to be mainly a consequence of Mr. Stevenson's article in the "Encyclopædia Britannica."

This work is undoubtedly of great value; it conveys a large amount of information, expressed very clearly. It is by no means abstruse, and an intelligent member of a Parliamentary committee on docks and harbours might with advantage spend a couple of days in reading this work, and thus at least learning something more explicit about a graving dock than merely its connexion with ships. This small work also contains the results of a large amount of experimental observation, against which, however, we have to make an occasional objection, that the means of making these observations were scarcely so precise and accurate as we could wish. The text is illustrated with ten plates of different marine works. These illustrations, though of course drawn to scale, are on too small a scale to be of much real use. The value of works like these increases in a direct ratio with the size, and completeness of, and number of dimensions on, the drawings. Little engineering and architectural drawings are, as some one has said, like little birds, the sex of which it is impossible to ascertain. We should also have been glad to see this work more completely indexed. In these fast times, in which, unfortunately, every one is in more or less of a hurry, an index is of great importance, and an alphabetical index is scarcely sufficient.

THE THAMES EMBANKMENT.*

FOR that personification of the constituency of the newspapers, "the general reader," information hitherto given respecting the Thames Embankment, may, by some writers, be deemed sufficient. But the columns of the *Builder* will be expected to afford particulars of other portions of the comprehensive design than the mere river-wall between Westminster and Whitefriars, and to describe those numerous and varied features of plan, and contrivances in construction, which the work of the two contracts now in hand presents. The entire scheme of the Embankment not only includes both sides of the river, but is connected as well with the sewerage, as with street-improvements in the City and the western part of London, more important than have been previously undertaken in similar period of time; and before looking at the separate landing-stairs and steam-boat piers designed, and structural features of the portion of the undertaking in progress, we may do well to note what were the intentions, so far as we can gather them, of the legislation of 1862 to which we referred in our last, and the proceedings of the Metropolitan Board following thereon, as well as the steps that were taken in the course of last year.

"The Thames Embankment Act, 1862," did not include the new street to the Mansion House: this was provided for by an Act of the following year. In 1863, also, an Act for a portion of the Embankment of the south side was passed; and notice was given of application to Parliament for powers to take additional land in Stangate and Palace New-road. In both years, reports appeared from the Commission originally named in 1861, and from Mr. Bazalgette, on the Southern Embankment; and, in connexion with the Northern Embankment, on improvements that had not been included in the Act of 1862, which has been named.

This Act of 1862 authorised works comprising not only the length of embankment since contracted for, but a viaduct to commence at the eastern boundary of the Temple, and to terminate near to the western side of Blackfriars Bridge; also a roadway 100 ft. wide on the embankment, and 70 ft. on the viaduct; a transverse, or crescent-formed, approach-road of not less than 40 ft. in width, and a gradient not steeper than 1 in 30, communicating with Surrey-street, Norfolk-street, and Arundel-street, which were to be extended; a street from the east side of the Middlesex end of Hungerford Bridge, to terminate in Wellington-street South, and to communicate by short streets with Villiers-street and Buckingham-street; a street joining Whitehall-place with the before-mentioned new street, near to George-street, Adelphi; a street from Whitehall, opposite the Horse Guards, through Whitehall-yard, to the Embankment near Whitehall-stairs; and lastly the reclamation and inclosing of the foreshore between the present bank of the Thames and the new line. Certain land in the parish of St. Margaret's, Westminster, however, was not to be taken without consent; and there were many other restrictions and stipulations.

The Act gave power to, and required, the Conservators of the River Thames to take from the bed of the river, and to deposit, at the cost of the

* See p. 537, *ante*.

Board, materials for the Embankment, when applied to. All the land reclaimed from the river, on the south of the streets described as running to Wellington-street, and Whitehall-place, not required for streets or roads "nor otherwise specifically appropriated" by provisions of the Act, "and lying between an imaginary line drawn from the eastern boundary of the houses on the east side of Cecil-street to the Embankment roadway on the east, and the Crown lands on the west, and the Embankment roadway on the south, together with the lands" on the southern side of the approach-road before referred to as connected with Norfolk-street, Surrey-street, and Arundel-street, was to be vested in the Board and maintained as recreation-ground; but, subject to provisoes, the Board were allowed to grant in perpetuity, or for a term, the reclaimed land to any owner of ground in front of which the roadway would pass.

Generally, as regards the lands acquired by the Board, and not wanted for the purposes referred to in the Act, or specially excepted, the Board might lease the ground and dispose of the ground-rents, or might sell. But before disposing of such lands, the Board were first to offer to sell them to the owners of the ground from which the lands were originally severed, the price being, in case of dispute, settled by arbitration.

It was not to be lawful to use any locomotive engine propelled by steam, along the streets or roadways. Nevertheless, an Act for the construction of an underground railway in the Embankment now seems likely to be obtained.

No building was to be erected in front of the ground of the Temple, other than porters' lodges; and, there, the ground reclaimed was to be vested in the Societies of the Temple: a private landing-place was to be constructed by the Board; but other compensation was not to be claimed.

Land belonging to the Duke of Northumberland, other than that required for the streets in continuation of Whitehall-place and Northumberland-street respectively, was not to be taken without consent; and no building, except with consent, was to be erected upon the lands taken, or on those coloured green upon a signed and deposited plan, except for the requisite fences, or for fountains or covered resting-places, or public monuments,—none of which erections were to exceed in height the level of 19 ft. above Trinity High-water Mark. The general width of the streets just referred to, and of one to be formed in continuation of Craven-street, was to be 60 ft. The street between Whitehall-place and Wellington-street was to pass under the northernmost opening of the Charing-cross Railway Bridge, that is, on the south side of the north abutment. Certain land was not to be taken from the railway company without consent. No landing-place, other than one substituted for the present Adelphi Pier, at the site now occupied by it, was to be constructed within 150 yards on either side of the present pier belonging to the Railway Company.

Opposite the Norfolk estate, the north side of the approach-road, and the approaches therefrom to Surrey-street, Norfolk-street, and Arundel-street, were to be constructed as shown on a deposited plan; no powers of compulsory purchase were to be exercised, except so far as might be necessary for the construction of the approach-road and approaches; no buildings were to be placed on the reclaimed land, between Somerset House and the Middle Temple, southward, except the works connected with the Embankment; the land between the southern boundary of the estate and the approach-road, was to become the property of the Duke of Norfolk, who was to have power to build up to the north side of the approach-road, and on both sides of the approaches to Surrey-street, Norfolk-street, and Arundel-street, compensation being paid to and by the Duke, and the Board, respectively.

As to the Adelphi estate, no part was to be taken by compulsion, except what might be required for the street between Whitehall-place and Wellington-street: the land reclaimed, and between this estate and the street, was to be subject to like restrictions as to buildings, as those in the Act of George III. which allowed of the embankment opposite Durham-yard, Salisbury-street, Cecil-street, and Beaufort-buildings; and this land was to be vested in the owner of the estate, after payment of any balance which would have to be paid by the decision of an arbitration subsequently referred to in the Act, the amount to be paid by the Board being also settled by arbitration; and as before, no building was to be erected between the land vested in the owner, and the river, other than works of the Embankment or roads, and landing-stairs, fountains, resting-places, and monuments. As regards the land opposite the Salisbury estate, no building was to be erected without the assent of the Marquis, with similar exceptions to those in the last-named case: the Marquis and his tenants in Cecil-street and Salisbury-street were to have means of access provided for them, to the ground reclaimed; and no roadway to Salisbury-street was to be constructed without the Marquis's assent, and if constructed was not to be open without consent, except for foot-passengers.

As to the Crown lands, certain works of filling up, levelling, and fencing, were to be done, as well as in the case of the ground opposite Somerset House and the Board of Control. All the land reclaimed was to remain vested and annexed, as the present ground, excepting that the lessees might within five years of the passing of the Act, take leases of the reclaimed ground from the Commissioners of Woods; no building being allowed to be erected on the Embankment, without consent by the Commissioners of Woods, in one case, and the First Commissioner of Works in another, other than a parapet-wall or railing, not exceeding 4 ft. in height; and the new ground taken by the lessees, being valued as garden ground. New landing-places were to be provided in place of those removed. Also, the Crown, or Commissioners of Woods, might at any time hereafter, require the Board to construct at the expense of the Commissioners, vaults or cellars, extending 12 ft. under a road or street connected with the Crown lands.

As regards the viaduct in front of the premises of the gas company, it was to be carried upon two arches, each having a span of 70 ft., and a headway of not less that 8 ft. above Trinity high-water mark; and there was to be one arch in front of Whitefriars Dock, of similar dimensions. The entire arrangement of the line between the Temple and Blackfriars Bridge, however, now, will undergo modification, the company for the construction of a railway in the Embankment having been more successful than the Metropolitan Board, in removing the difficulty of the gas works. There is much trouble in planning the routes and gradients of the many lines of road, railway, sub-way, and sewer, which will meet and intersect at Blackfriars Bridge; but the viaduct above referred to, and the construction in connexion with it, of a roadway on iron columns, spoken of, after the passing of the Act, by Mr. Bazalgette, will probably no longer be persevered in.

In the debate of the 3rd of July, 1862, Lord Palmerston referring to the question of the carriage-way past the ground of the Crown lessees, observed that the opponents of the Government "only said that the lessees of the Crown were to have this addition to the gardens they occupied; and that they were ready to furnish the money to make the Embankment. But if so, they might go along the whole river, and allow each proprietor to buy up that portion of the Embankment which ran before his own house." Yet defeating the manœuvres in one place, and preserving the full use of the road, Government and Parliament allow not only the Crown lessees to obtain reclaimed ground, but have given certain parties power to prohibit the erection of buildings on similar ground, and to control the traffic of certain streets of access to the Embankment. The Metropolitan Board is not able to build on such reclaimed ground: the ground is appropriated to the owners in the position of those referred to. Of the recreation-ground there will be about 13 acres, truly a gain to London. But considering the want of sites for many important buildings, as the projected law-courts, for which the Embankment would be more suitable than the Strand and Carey-street, we are not disposed to give unqualified approbation to the measure of the Legislature.

The day after the Act of 1862 had received the Royal assent, the Metropolitan Board appointed a committee to carry the measure into effect; and on the 22nd of October, a report by Mr. Bazalgette appeared. In this report, there comes to light a defect of the Act, which was alluded to in our last article. The clear water-way of the Thames is 900 ft. wide above Blackfriars Bridge, and 900 ft. at Westminster Bridge; whilst it is 1,120 ft. at Waterloo Bridge, and 1,020 ft. at Hungerford Bridge. In passing through Southwark and London Bridges,—at the former of which, the water-way, according to Mr. Bazalgette, is 660 ft., and at the latter is 700 ft.,—the tidal-water flows with sufficient velocity to keep the channel there free from deposit. But where the channel spreads to nearly double the width, as at Waterloo Bridge, a partial and contracted channel is formed in the north bend of the river, whilst there is much deposit on the south side. The embankment-line now is to take in the first arch and pier of the bridge. Had it extended to the second pier from the Middlesex side, a more uniform section of river would have been the result; whilst eight acres additional of land would have been obtained. The limits of deviation allowed by the Act, however, do not extend so far as the second pier; and fresh powers would have to be sought, involving a year's delay, to get the legislation accordant with the circumstances and the requirements. Mr. Bazalgette says, the Board are not responsible for the defect; but the bungling which there must have been somewhere, is not likely to be satisfactory when looked into by the public.

The face of the Embankment as shown by the contract-drawings, which are before us, and by Mr. Bazalgette's description in the report mentioned, is to commence at the northern abutment of Westminster Bridge, in a line with the existing embankment of the Houses of Parliament, and is to extend in a slightly curved line to the northern brick pier of Hungerford Bridge, and thence onward. The general direction is already marked out; but it should be recollected that the iron caissons are only appliances of the construction, and will be removed, except where below the bed of the river, to expose the facing of granite of the actual wall which will be built behind them in short lengths of coffer-dam. At Richmond-terrace, the face of the Embankment will be 220 ft. in front of the present high-water line: at Scotland-yard, it will be 400 ft., and at Hungerford Bridge, 300 ft. Opposite Buckingham-street, the Embankment will extend 450 ft. into the river; opposite Salisbury-street, 300 ft.; opposite Somerset House, 130 ft.; and opposite the eastern side of the Temple, 200 ft. The general level of the Embankment-road will be 4 ft. above Trinity High-water Mark, or 22 ft. 6 in. above the low water-line as marked on the drawings. The roadway will be joined with that of Westminster Bridge by an incline of 1 in 80, and the footway by a broad flight of steps; and the Embankment will pass under Hungerford and Waterloo bridges as will have been understood.

The present differences of level will necessitate careful planning. The roads connecting the Embankment with existing streets, would include, besides the approach-road to streets of the Norfolk estate, the new street from Wellington-street passing through the Savoy, and falling at an inclination of 1 in 40, under Hungerford Bridge, to near Northumberland Wharf, and joined with Whitehall-place by a prolongation of the latter, and having branch streets, in continuation of Cecil-street at an inclination of 1 in 50, of Salisbury-street at 1 in 63, George-street 1 in 125, Buckingham-street 1 in 127, and Villiers-street 1 in 60, and the street opposite the Horse Guards, from Whitehall to the Embankment, nearly on a level. But several of the existing streets at right angles to the Strand would be very inconvenient as thoroughfares. Norfolk-street, 40 feet wide, and the best of them, would have an inclination of 1 in 25. Mr. Bazalgette has also shown that provision had not been made for a direct line of communication between the Embankment and Charing-cross,—though such a line would probably tend to relieve the Strand and Fleet-street more than any other,—and that, should a line through the gardens of Northumberland House be deemed too costly, a route might be obtained by purchasing the houses between Northumberland-street and Craven-street, and passing in a curved line from the east corner of Northumberland House. That route from Charing-cross to the east of London, he says, would be 400 ft. nearer than by Whitehall-place, and 100 ft. nearer than along the Strand and down Norfolk-street, whilst the gradient would be more favourable than in either of the other cases. A better proposition however would seem to be that of a street prolonging the line of Duncannon-street and that in front of the National Gallery, from the north end of Villiers-street next the Railway-station, across Off-alley, Duke-street, Buckingham-street, and George-street, and crossing the other road opposite the Adelphi, to the end of Waterloo Bridge at the site of the intended steam-boat pier. In the report to which we

have alluded, Mr. Bazalgette submitted that the street from Wellington-street should commence in the Strand at the junction of Wellington-street, instead of as originally proposed, opposite the end of Somerset House.

During the autumn of the same year, 1862, when the reports appeared on the embankment of the south side, other parts of the comprehensive undertaking, with the street improvements, were under consideration; but we defer full particulars till the drawings now in preparation come before us. We may mention, however, that in November of 1862, the Board gave notice of intended application to Parliament for power to construct not only a street towards the Mansion House, but a continuation of the Embankment in the direction of Southwark-bridge, as far as Queenhithe, and a second street thence to the Mansion House. And in February of the following year, the members of the Commission of 1861, with Mr. Tite added, were appointed to consider plans for these several objects, and also for uniting the Embankment at Westminster Bridge with the existing embankment at Millbank. But they reported, as had the Commissioners in 1861, against the line to Queenhithe, on account of the probable heavy claims for compensation. After considering a proposed line to St. Paul's-churchyard, they concluded in favour of the line originally recommended by the Commission of 1861. They were against any enlargement of the present embankment in front of the Houses of Parliament, and in favour of considerable improvements about the Victoria Tower, as well as of the widening of King-street. Soon afterwards, an Act for the street to the Mansion House was passed; and a Bill for a portion of the Southern Embankment above Westminster Bridge was brought in.

There were points in connexion with the scheme of the new street which caused considerable difficulty and difference of opinion. The Commissioners had recommended a line in which there would have been gradients of 1 in 30, and one which would have had the effect, as it was said, of excluding the wharfingers from an approach to their own premises.

In April, 1863, the drawings for the Embankment of the north side were ready, and Mr. Bazalgette reported upon them to the Metropolitan Board. The total length upon which a commencement was then to be made was 5,710 ft., exclusive of the spaces occupied by the piers of Hungerford Bridge and Waterloo Bridge. This length was made up of 3,740 ft. of the first contract, undertaken towards the end of last year, by Mr. Furness, for 520,000*l.*, and extending from Westminster Bridge to Waterloo Bridge, and for a short distance eastward; and of 1,970 ft. of the second contract, about the commencement of the present year, undertaken by Messrs. Ritson & Co. for 229,000*l.*, and extending from the termination of the first contract to the eastern end of the Inner Temple Gardens. The two contracts include, besides the general line of embankment, sewer, and subway, steamboat-piers at Westminster, Hungerford, and Waterloo Bridges, and landing-stairs opposite Whitehall Gardens, Salisbury-street, and Essex-street, besides works for upholding the pier of Waterloo Bridge, and numerous short lengths of intercepting sewer, and arrangements of wiers and penstocks to old sewer-mouths, retained as storm-water outfalls. At Westminster Bridge, the arrangement consists of a single recess for the dumby, or floating portion of the pier; but at the other two bridges, there are two of these recesses and dumbies, or one above the bridge and the other below. The landing-stairs opposite Whitehall Gardens will include as the chief feature, York Gate, at present at the end of Buckingham-street, but with the addition of steps right and left to a landing, and an arch and substructure of rusticated masonry, in place of the broad platform and steps in front, of the original design.

The construction of each of these piers and landing-stages includes some of those elaborate contrivances in connexion with the sewerage, to which we have already alluded, and may further describe. And in the case of Waterloo Bridge, further contrivance, just now adverted to, was needed from the fact that the level of the bottom of the footings of the Embankment-wall was about the same as the bottom of the footings of the bridge, so that the excavation for the concrete of the wall would be even below the footings of the bridge. To describe the manner in which the important protecting work to the bridge, that of the sewerage, and that of the contrivances for preventing deposit in the recesses, are proposed to be executed, would, however, demand more space than we can spare now. But, in this number, we give a view of the steamboat-piers at Waterloo Bridge.* It will explain what will be one of the features of the finished Embankment; though it shows, even as to the single point in the line from Westminster to Whitefriars, nothing of the contrivance and construction in which great engineering skill has been brought to the preparation of the drawings and specifications of the two contracts, and to the devising means of executing the work by the contractors.

THE POETRY AND VARIETY OF ENGLISH MASONRY.

MANY a summer's day may be pleasantly and profitably spent in reading the stories told by ancient stonework. Fashioned by different races in distant centuries, there are vast gradations of feeling expressed in masonry. As in music, as in architectural ornament, as in art of all kinds, there is an indisputable stamp, or style, that marks the work of different ages in the same country: in the work of different nations the points of divergence are still more easily distinguishable.

Can you see upon the Kentish coast, about a mile from red-roofed Sandwich, a mass of ruddy walling standing up amidst the corn? That is a fragment of Richborough Castle, all that remains of the most frequented haven and port in all Britain in the days of the Roman occupation, *Portus Rutupensis*. Of the sea frontage of noble edifices, the temples, baths, schools, wharfs, arsenal, magazine, and amphitheatre, there is but one monument, this fragment of walling. The river Stour, then wide and deep, has shrunk up into a stream, and the sea has receded and left dry and bare the bottom of the bay upon which the Roman navy floated. But still, guided by this grass-tufted fragment of ruddy masonry, one may say it was here that Vespasian came; it was here that Claudius Contentus and Flavius Sanctius, both prefects of Britain, were buried; it was at the foot of this hill that Hengist and Horsa landed with their forces; it was here, more than 500 years afterwards, that King Sweyn came and burnt and slew all before him; it was here, too, that a tonsured monk landed, carrying, we may be sure, the sign in his hand that was to endure in the land for evermore—the cross. St. Augustine must have looked upon that ruddy walling with a wistful gaze after his sea voyage, for the Saxon kings had made the old fortress into a palace, and the holy father was to find King Ethelbert his most influential convert. And now the crowd upon the landing-place is gone, the bronzed warriors on guard are gone, the streets are silent, the buildings are overthrown, for the mighty sea rose and left a barrier of silt it never more overflowed. Some workmen digging to lay the foundation of a sluice, some time back, came upon the old seashore, strewn with shells and seaweeds, just as Italian workmen at Pompeii, digging into the lava, came upon the old, old surface of that city. Besides the shells and seaweed on this strip of shore there lay a small shoe, with a fibula in it, lost there or thrown there hundreds and hundreds of years ago. Corn ripens upon the site of this busy port; poppies flaunt where men wrought and lived; blue-winged moths are fluttering in the air; the peewit and corncrake make monotonous music where crowds chaffered and people came and went, and ships were made fast, laden and unladen; and the plough turns up countless coins and mementos of the traffic. Breasting the corn as a giant might breast the ripples of a lakelet, stands this fragment of the fabric raised by the Roman warriors after they had subdued Arviragus, the gallant British prince who endeavoured to prevent them from landing. The bronzed war-smiths, how they must have toiled! Six acres and more of land they marked out in the form of a parallelogram, on a declivity facing the sea, and set to work. We may see they raised the walls, 11 ft. thick and 23 ft. high, good measure. At the angles they built round projecting towers, and between these they threw out others that were square. The latter were solid for the first 8 ft. above the ground, and then hollow. How the bronzed battle-smiths must have toiled, and stooped, and lifted, and stretched, and climbed. Consider the labour of building a wall 11 ft. thick and 23 ft. high, to enclose an area of nearly 6 acres, when the gates were barred, in a strange land, and surrounded by hostile people. We may see how they went to work,—how they used the materials of the district as far as they would go, or were procurable. The ashlar they formed of squared grit and Portland stone: they backed this up with rows and rows of boulders, or large flint pebbles, over which they strewed as they went on a layer of smaller pebbles, fragments of flint and brick, and blocks of chalk, which fell into the interstices between the larger boulders; and all this was grouted together at various stages with a cement, a large ingredient in which was the refuse of their tiles. When the wall had advanced 5 ft. in height, they laid a double row of large flat tiles upon it to bond it together. Upon this they raised seven more courses of the squared work, then placed another double row of the thick red tiles, and so carried the work up to its full height with double rows of tiles inserted at intervals of from 3 ft. to 4 ft. Thus was formed this fragment of Roman masonry. It would have taken the bravest of Britons to have scaled that wall while the work was neat and trim. But now you may catch at any of the tufts of scorching grass that are protruding from the clefts, and climb up to the top unchallenged. You will see the cornfields spangled with poppies, and, beyond the marshland with its fluttering veil of blue-winged moths, the dazzling channel looking as like the road to fortune as it did to Julius Cæsar, Vespasian, Hengist and Horsa, King Sweyn, William the Norman, and other adventurers. If you look into the area, enclosed by the remains of the circumvallation, you will see a bare place in the midst of the standing crop, in the form of a huge cross, some 87 ft. long, that nothing will grow upon. Successive generations of antiquaries have examined this cross and probed it, and found that it is a compact mass of masonry, and that is all that they can make out of it. Whether it is the foundation of a Roman sea-mark, or of a Saxon memorial, to indicate the spot St. Augustine consecrated, or the platform upon which some other building was raised, may yet be ascertained. It is one of the curiosities of the castle-field that you will see as you shade your eyes and look round from your vantage ground, raised by the mighty war-smiths of Rome.

You may tell Norman from Roman masonry, without looking at a scrap of ornament, as you would have told the Roman from the Norman invasion, at a glance. The stones used by the Normans were but as handfuls compared to those used by the Romans; just as the men with which William made his venture were but as a handful compared to the Roman legions. The first Norman work was in reality Saxon work: so the antiquaries of the last century—Sir Walter Scott among the rest—were nearly right when they called Norman buildings Saxon; for the victors seized upon the vanquished, and made them build the strongholds that were to make the conquest permanent. We may note the economy of labour enforced by scarcity of hands by the diminished thickness of walling with the substitution of flat buttresses at intervals to give the necessary strength. The stones were reduced to a rough uniformity of size and squareness, or height and breadth, by no means considerable, suggesting, indeed, that the compulsory masons had no labourers, and that each could be lifted by one man. The rubble shows a certain hurry too, being but mere rubbish; not boulders gathered from the shore by a legion of gatherers, but mud, chips—anything that was at hand; the whole being bonded together, so to speak, with sighs and regrets that time eventually hardened into indifference, and thence into content. There is plenty of this Norman work wrought by Saxon workers in the land; plenty in Kent, not far from the Roman legacy, at Dover, for instance; and here and there fragments in every county, even to the northern extreme of the island, where there are several examples within the jurisdiction of the see of Durham. Cold and hard it looks in its regularity as though men had clenched their fists and ground their teeth as they built it up.

There appears to be in the enriched Norman work that followed this a lavishment of secret, and even open, exultation, as though the workers were happy,—as though the generation or so of masons were content and charmed with their task,—as though, as it was in truth, a calm had succeeded a storm. Out of this storm arose the exaltation that produced the best of workmanship, that of the Early English period. The same intensity of devotion that produced the

* See p. 565.

greater number of our cathedrals at this time insured that every stone should be wrought and laid to the honour and advancement of the work. Every mason seems to have regarded the fabric, in its entirety, as a re-edification of the temple heathens had overthrown; and each particular stone upon which he was employed, one after one, as so many offerings to be laid before the altar. Thus the masonry of this Plantagenet period may be read as an expression of a devotion that felt labour was prayer and praise. The transitional period that ushered in this perfection of workmanship partakes to a great extent of this disencumbrance of the mind from remunerative considerations, as represented in the use of attractive ornaments to the neglect of less showy details.

Come a few miles out of your way, and look at the gateway of a border town not very far south of the Tweed. First look at the tint there is upon it, as deep, sombre, threatening, as that of a thunder-cloud; so imminently threatening, indeed, that as you gaze, you would not be surprised to hear a peal burst from it. Then look at the stones. Huge blocks they are, with the jointings deeply recessed, leaving the edges standing out in rough lines of light. The rains of four hundred summers, and the frosts of four hundred winters, have smoothed and worn away everything in the likeness of an angle, and the mass remains a silent, solemn, rugged remembrance.

"And dark and true and tender is the North,"

you will think. There is no ivy, no blade of grass, nor a leaf of any kind in sight. The gateway pointed out spans a thoroughfare that is the entrance to a town. A hay-cart, piled up with hay, has just tried to pass through the archway, and failed. The carter is busy taking off the topmost bundles of his fragrant load to reduce its height, and the approach is littered with scented shreds. Looking through the shadowy archway you will see a broad street of stone houses of irregular heights (with a shop or two among them, to add to their irregularity), that widens as it leaves the gateway, till it divides into two roads, and leaves a triangular group of houses standing in the midst at the point of severance; and, if you stand a little to the right, you will see that one of these roads opens into a market-place. You would never guess that the other road, narrowed to a mere neck just there, was a portion of the great north road between London and Edinburgh. Yet princes have passed that way full many a time. It leads to the barbican of Alnwick Castle, and away hundreds of miles past it into the dark and true and tender north. This storm-cloud of a gateway was built by the son of Hotspur. Eleven years after the death of that gallant knight his son was restored to the family honours by the successor of the offended monarch; and, in good time, the young Percy, with all his father's energy of character, began to build on his vast possessions in this massive manner. Over the gateway, in a recessed panel, is sculptured the Percy lion,—placed there, it would seem, as men place their seals to documents, to say "this is my act and deed." Over the lion protrudes three corbels, to hold some extra defence should temporary need require it; and the wings of the gateway are thrown forward in the form of three sides of an octagon, to give additional protection to the passage through the centre. The stout town wall left the gateway on either side composed of masonry as massive, as profuse: no stint here, of either workers or material. The Scots were, of course, the common enemy all this was supposed to defy; but it is impossible not to think that the great fight near Shrewsbury, the quartering and dispersion of Hotspur's remains, the subsequent alienation of his inheritance, find some expression in it,—some precautionary expression that the chances of any further civil war should have a different ending. But, one-and-twenty years after leave to embattle the town had been obtained, this knight was lying with his face turned up to the sky, cold and stiff, upon the battle-field of St. Alban's. The moaning of the wind as it sweeps through the darkened archway brings to mind the sound of muffled drums, the great stones seem so many sighs, the great interstices so many shudders as we think of this.

Very different from this grave and sad kind of masonry, reared within a ride of Chevy Chase, is that the fifteenth and sixteenth century men wrought. There are no such ledges to catch rain and snow and cast shadows: no such stern resistance, sullen reliance implied in it. The stones are neater, smaller, arranged with a flatter surface; the interstices mere chinks. Somehow this masonry appears to have absorbed all the sunshine that has ever fallen upon it. It appears to be mellow; almost melliferous, if one might say so. If it be less like the temper that dictated chivalrous exploits it is more like the sweetness that devised "Arcadia," the "Faëry Queen," and a "Midsummer's Night's Dream." Kenilworth Castle comes, a-glow with noon-day heat, to view. Haddon Hall, on the Wye, too, amidst a crowd of other examples, comes, pictorially, to mind as a specimen that half a dozen generations of artists have made familiar to many. Wandering about the untenanted hall, who does not feel as some wight of old arriving at an enchanted castle, and move on and on, through the courts, chambers, hall, and gallery, expecting at every step to be met by something not of this world; expecting in every oriel to come upon a group belonging to other days? The footsteps of Sir Philip Sydney, Spencer, or Shakspeare might have been the last that trod the glorious terrace so mysteriously deserted and yet so mysteriously kept in an elvish kind of order.

There is a later Tudor masonry that is not so poetical. It is stiffer in manner, less ripe in appearance, laid more by rule: as though a knowledge of machine-executed labour was dawning in men's minds, and they aimed at rivalling any such process applied to stonework. Some of this effect is doubtless due to the comparative newness of the ashlar; but more to a sentiment of progress which at that age had begun to show itself in the study of antiquities as curiosities, and in the reproduction of Roman and Norman forms in ornamentation as proofs of scholastic elegance. We are thinking of the workmanship of which Burleigh House is a stately type. Of much angularity and of a cold grey colour, these stones might have been wrought in our own prosaic age. All that this seat gains in effect from the leafage of its grand park and glitter of its gilded vanes and variety of its enrichment is wanted to realize that it is an Elizabethan *chef d'œuvre*.

Turning seawards, could we suggest a material more declaratory of our insular position than the flint and freestone mural surfaces of our eastern coast, or a more masterly manner of using it than that adopted by the builders of Early Norfolk and Suffolk churches on the coast, or of those in the lime districts in Kent? It is, however, most appreciable in those venerable and sunbleached edifices that assume a twofold character, and serve as landmarks to those that go down to the sea in ships. A score of white fishing villages, with fluted red roofs and glossy-black doors and palings, redolent of tar, rise before the eye like a vision out of the sea, at the mention of them. A redolence of seaweed, drying nets, seasoning timber and dried fish, accompanies the remembrance of unconsidered trifles, ropes, cables, oars, blocks and pulleys, and other fishing gear that form part of every seaside scene: the crunch of footsteps on the beach, snatches of sailors' songs, and fragments of the long, long story the wind is telling to the idle waves fall upon the ear. For 600 years men have gathered flints, broken them, bedded them in mortar, with the broken faces placed to form a sheeny surface, after the same fashion, with as little change in the mode of conducting the operation as the sea-terns have made in scooping out their nests in the sand. The artistic portions of the fabrics show stages of progress, but the matter-of-fact process of building appears to have been instinctively grasped.

If we leave England, we may see as much feeling and variety in masonry: certainly not more. No echo of a "wild Irish" chant could be more weird or moving than those hoary, mysterious, cone-topped Irish towers: no "second sight" reversed and directed to primeval times, when a few tribes wandered over the land with reindeer, could be more quick with strange undreamt-of life than the "sorcery halls" with their Runic writings in the North of Scotland. Could a Welsh harper fire the blood in one's veins by any recountal more than an eye-feast upon the grand Cambrian castles of Harlech, Carnarvon, and Conway will do? They must have been brave men to have called for so much castle-building at the hands of Edward; and all honour to the brave. On the Continent, in the cities that now occupy the sites of the vast old-world forests, there has been the same power of expressing thought and circumstances in stone.

Here is one foreign example. About fifty miles from Baden-Baden there is a town of some 10,000 inhabitants, whose principal trade is that of polishing crystals and precious stones. It is seated on a plain surrounded by distant hills. You will know it by its rows of poplar-trees, its step-gabled houses, its convents and university; but more by the exquisite spire that rises above all these things. You will own, at once, that a mind familiar with other minds in daily contact with the refinement and refining of precious stones is the only one likely to have conceived the idea of lavishing so much love and labour on such an object,—of treating red sandstone with the utmost witchery, and capping a tower nearly 240 ft. high with a spire rivalling in its open-work tracery the effect of rich point lace. This Freyberg spire is exactly 155 ft. high. It rises from an octagonal stage, having triangular spirelets at the angles, which, in its turn, has for a still lower stage the plain and simple square base containing the porch. The interior of this church does not yield anything so captivating to the imagination. There is no triforium; but, as we remember Freyberg, this omission was scarcely noticeable, for the walls were hung with black cloth; not a step was stirring; and, resting on trestles in the centre ambulatory, in the solemn silence and solitude, lay a coffin. But, perhaps, of all the poetry to be read in masonry, the most sublime in the world is that in the huge bevelled blocks in the Wailing-place of the Jews in Jerusalem, where the stones are worn away with the lamentations of the Israelites.

FORMATIVE ETHICS, OR THE MORAL SCIENCE OF RECTIFYING ABERRATION, AND OF DEVELOPING THE PERFECT AND BEAUTIFUL.

BEING dissatisfied some years ago with the capriciousness of modern criticism and the prevalence of extreme differences of opinion, where there would be general consent if men had but a criterion of judgment and a definite purpose of thought and action, I resolved, if it were possible, to obtain such a criterion and to enunciate such a purpose. In pursuing these objects, I have frequently had to reject the results of much intense but fruitless thought. In noticing the fundamentally quantitative nature of all *exact* science, however, I had discerned the clue which has since led to a distinct view of man's formative purpose, viz., the Rectification of Nature by Mind and to the discovery of a criterion, calculus, or compass of judgment, which, once thoroughly understood, enables us to determine the measure of rectitude, and to definitely estimate departure from it in every species of phenomenon of the solar system.

It is a leading principle of Formative Ethics that all true art (using this word in its most comprehensive sense) has the rectification of nature as its ultimate object. From this enunciation of a leading principle of the science, an enunciation with which most thinkers will agree, it will appear that it does not aim to astonish by new doctrines, but to induce a more consistent mode of thought than generally prevails. It has been stated, indeed, that no discoveries can be made in ethics; yet no allusion to the theory now propounded is to be found in any modern work I am acquainted with, although it is distinctly enunciated in the sacred Scriptures. The science of Formative Ethics having been worked out independently of other moral systems, gives a command over the subject which enables me to re-unite and grasp the scattered fragments of what I believe to be an ancient philosophy into one consistent whole. Fragments of familiar every-day wisdom, the leading feature of the Aristotelian ethics, will be found re-united in Formative Ethics, which moreover coalesce and harmonise with Christianity, and have reference not only to human conduct and development, but to the government of the spheres, the whole of animated nature and art. An outline of the science of Formative Ethics will be traced under several heads before entering upon the quantitative analysis of phenomena, or drawing those inevitable conclusions consequent upon the consideration that all differences in phenomena have their corresponding quantitative or numerical expression, which it is the vocation of all science aspiring to the title of "*exact*," each in its special department, to determine and record.

1. The first great question which presents itself on the threshold of ethical inquiry is, are wrong, error, and imperfection, more than

nominal distinctions? If they be not, with or without ethical systems, nature can never be otherwise than as it ought. This question, however, it is assumed has been affirmatively determined, and that the words right and wrong stand for real distinctions in the nature of ideas and of things.

2. The mental conceptions of right and wrong include the ideas of a normal and abnormal state of nature, and of the possibility of gradually rectifying, converting, or developing the latter into the former. On this rectification of nature being possible, the utility of ethics, and the validity of the distinctions of right and wrong are logically dependent; for no wrong, error, or imperfection were possible, if all the differences in ideas and things were unalterably fixed.

3. Observation and experience confirm these *a priori* ethical conceptions. From experience and observation, we learn that nature is alterable, and capable of such rectification, or development; that the knowledge of rectitude is gradually becoming the guide of human action; and that wisdom has not only the power to rectify the inner world of human ideas, but also the outer world of visible and tangible forms.

4. The nature of things is comformable to the perfection or imperfection of ideas. The rectification of organization and form is a re-creating, re-making, and remodelling of the real to the pattern of the ideal. And as all right or perfect are also moral ideas, the real so rectified is said by Formative Ethics to exist in its moral form. The sensuously good, beautiful, and perfect are the realizations of the ideally good, beautiful, and perfect by rectitude of action.

5. As the establishment and appreciation of a science of ethics of a theory of rectitude, by which this re-creation, re-formation, re-modelling, or transmutation of nature is being directed, is due to right-mindedness, the great work in progress has been designated the Rectification of Nature by Mind, and the theory by which it is guided—Formative Ethics.

6. By a slight alteration of expression the rectification of nature by mind becomes that of the rectification of nature by right, or moral ideas and action, which coalesces with the Scripture doctrine, "the Rectification of Nature by the Spirit of Truth."

7. A complete science of ethics would propound the theory of rectitude or the ideal conception of every species of phenomenon; that is to say, it would propound the moral theory of the universe,—that best constitution of it, in which every species of phenomenon, whether of ideas or of things, would have its full, complete, or perfect existence.

8. But, as it will presently be demonstrated that the fundamental form of all exact mental conception is quantitative, a complete science of ethics would also demonstrate the numerical expression or measure of rectitude in every species of phenomenon.

9. All exact knowledge, therefore, might be recorded under the comprehensive title of orthometry (right measurement); and that special department having reference to *exact* moral science might be specified as quantitative ethics. The quantitative expression of rectitude has the sanction of Holy Writ.

10. According to the scientific conception of ethics, then, the Quantitative Rectification of Nature is the great work to be accomplished by moral ideas and action. The rectification of the understanding of human ideas must precede the rectification of imperfect action and forms. The right conception of the best condition of every species of phenomenon has to be acquired before the imperfections of species can be corrected. The inward and invisible ideal conceptions of things will then be gradually realised in nature; right ideas gradually find embodiment in outward and visible realities. This is also, as before affirmed, the teaching of Christianity; but Christianity breathes faith, hope, and life into what would otherwise be a cold, spiritless scientific formula.

11. The words "ideal," "right," "moral," "good," "beautiful," "normal," and "perfect," are considered to be equivalent or correllate expressions, as also are their contraries, "accidental," "wrong," "immoral," "bad," "ungainly," "abnormal," and "imperfect."

What ought to be the sole inquiry with every man who takes to himself, or deserves from others, the designation of philosopher? Should not the exclusive question be, and should not the answer to it be sought with equal simplicity and earnestness of purpose,—What is truth? What other object can there be of aught that is entitled to be called philosophy, but the discovery of truth? Of what conceivable use or value are all the investigations and reasonings of philosophy, if not for ascertaining truth? Such are the ever-recurring questions. Who, however, having given them serious thought, has not felt their vagueness, found the thread of his inquiry soon entangled, and given up, for a time at least, all hope of satisfactorily solving the question, "What is truth?" But, if the equivalent, though more explicit word for the kind of truth implied in this question, had been substituted, they would have gained perspicuity; for the question of paramount importance to mankind is not, What is truth? but, What is right?—in thought, in act, and in being? Truths are as multitudinous as facts, and are of two kinds; but there is only one right or best condition in every species of phenomena, and this is the kind of truth, beyond all other, which philosophy has to determine; for, although everything in nature, *per se*, is a fact,—*is* a truth, it does not follow that it is also right. To eliminate every possible form of aberration from the conception of any species of phenomena, and to rectify and reform according to the residual ideal, is the doctrine consonant with divine teaching and of Formative Ethics.

There often arises a confusion of ideas, too. When it is asked, "What, in the name of common sense, has a man to do, but to act and work in conformity to nature?" For the word "nature," like that of "truth," has two significations, the one implying only that which is *right*, the other all that is possible in thought, act, and being; so that the limited meaning of *that which is right* gets transferred to it when used in its widest sense of *all that is possible*, and nature frequently discoursed upon as if it were immaculate. If nature were immaculate, unerring, there would be no moral law: it is the aberration of nature from rectitude which renders a remedial moral science necessary. It is the rectification of nature which all ethical systems have more or less in view; but it is Christianity only which grasps this idea in its totality, in teaching the gradual subjugation of the spirit of error, and the final restoration of all things in rectitude. The full import of this great doctrine in its material application has not hitherto been discerned, much less understood.

There is a perfect agreement between experience and revelation in this, that nature is capable of being perverted from, or converted to its best conditions. All means, therefore, whether improving or debasing, are natural means,—means which either mend or mar, but still within the compass of Nature's powers. The following quotation from Shakspeare is to the point:—

> *Perdita.*—I have heard it said
> There is an art, which, in their piedness, shares
> With great creating nature.
> *Polixenes.*— Say there be,
> Yet nature is made better by no mean,
> But nature makes that mean: so that the art,
> Which, you say, adds to nature, is an art
> That nature makes . . . . We marry
> A gentler scion to the wildest stock,
> And make conceive a bark of baser kind
> By bud of nobler race. This is an art
> Which does mend nature,—change it rather; but
> The art itself is nature.

This power over means to change nature and dominate it to our will is a mental power conferred by knowledge. The material world is conformed or moulded by man to his mentally right or erroneous conceptions by his good or ill will. All causation, according to the Christian doctrine, is either moral or immoral. All imperfection and deformity proceeding from the spirit of error, all goodness, beauty, and perfection from the Spirit of Truth. All outward perfection and imperfection indicate the moral and immoral sources from which they spring. The moral and immoral powers produce corresponding effects,—that is to say, outward moral and immoral conditions and forms. Whether right or wrong in its conceptions, it is the inevitable tendency of mind to dominate and subdue other nature to its own: if right in its apprehension it preserves and re-forms, if wrong it deforms or destroys.

It may be legitimately inferred that the wisdom of man differs in degrees, and not in kind, from His who made him pre-eminent in, and gave him dominion over, the earth; and that as he partakes of or more and more advances towards that measure of the divine nature to which he may attain, will he desire to restore all things to their best conditions; for he has been taught that the universe existed at the fiat of the Creator an embodiment of the divine ideas, perfect in all its phenomena. Imbued with these considerations, the doctrine of the Rectification of Nature by Mind is invested with a higher dignity and importance than any which its sciential and artistical utility confers; for it is discerned to be correlated with the great Christian doctrine which reveals that nature is to be finally reinstated in the perfections from which it has been gradually perverted by the spirit of error. The Christian doctrine of Restoration accurately defines the nature of true progress,—that progress in which inheres the breath of life, the progress which is irresistible. And in this Christian and scientific view the development of beauty and perfection, by moral ideas and action, is transferred from the narrow sphere of the canvas and marble to the plastic world of organic and inorganic being: this is art in its widest sense, the great Christian art which, proceeding from a "new spirit," mends and tempers nature, and with more than Phidian power corrects excesses and defects, proportions, remodels, and restores terrestrial nature to its Moral Form.

The pernicious and deforming influence of human error is not confined to man: it permeates all other nature under his dominion; so that this is also marred in its outward form and fabric. The world, with all things in it, retrogrades from or progresses towards its perfect state, as the soul either falls in ignorance and misused knowledge or soars upon the wings of faith and science. Body or substance is moulded by the rectitude or error of the mind;—the material by the spiritual. This is why Christianty promises as the result of inward renovation the outward development of human and other nature to their fulness of beauty and glory. Experience teaches us that the rectification of nature by mind, a material restoration, is possible; for from it we learn that nature, under the constant culture and compulsion of right reason, of rectitude of mind,—like the clay that was marred in the hands of the potter,—is made again as it seemeth good to the true workman to make it. Hence it is the duty of orderly and scientific minds to define the Moral Conditions and Moral Forms of nature; to point out the Christian art of educing them; and to proclaim that physical beauty and perfection are to be the outward and visible signs of the presence and imperial sway of the Spirit of Truth in the human mind.

If the Dorians had possessed the right comprehension of morals they would not have prayed, as it is recorded they did, for the beautiful to be associated with the good; for they would have then known that persistent goodness would inevitably produce its external evidence in beauty. A clearer perception of the relation of the beautiful to the good was evinced by him of old, who, when interrogated respecting the final purpose of philosophy, replied,—to make that which is inward,—*i. e.* ideal conceptions,—outward.

"What!" it will be said, "do you maintain and believe that human ungainliness and deformity are to be gradually but ultimately extirpated by moral ideas and persistent moral action? We know very well the extraordinary changes which have been produced in animals, plants, fruits and flowers by art; but human nature is a very different matter: we do not believe in its convertibility." It is, perhaps, a little more perverse and obstinate and therefore less ductile and plastic. Nevertheless, that is the doctrine of Formative Ethics, nay of the highest authority, even Christianity. Let it be borne in mind, however, that Formative Ethics do not maintain that ungainly and deformed humanity is to be at once transformed to beauty by right-mindedness and rectitude of action: imperfections of organization and form may be the effects of malcausation of ancient date, for which the bearer is not responsible; the gradual accumulation of years, it may be of centuries, of misdirected thought and action. Such physical decadence, then, is not to be rectified in the twinkling of an eye, but by gentle gradations, according to the unalterable laws of human growth and change. The human race must ascend towards perfect organization and form as gradually as it falls from it. The effects of rectitude of thought and action must accumulate through years, perhaps through generations, before the evidences of present or past malcausation can be completely erased, and humanity culminate in the full beauty of its Moral Form. Meanwhile those imbued with a right spirit,

though they cannot be transformed by it at once to this physical perfection, are irradiated with that spiritual light which suns out the dark ungainly shadows of bodily imperfections, for beauty of some kind must be associated with goodness in the divine constitution of things. By goodness alone can beauty be preserved; by goodness alone can beauty be produced throughout the wide domain of nature. This is the doctrine of Formative Ethics.

It is contrary to reason to suppose that any function or power of being, rightly used, should tend either to produce or increase malorganization or malformation; but that perfect organization and form which corresponds with its moral use, that is to say, its Moral Organization and Form. Apply this reasoning not only to human functions and powers, but to those of all other being, and we shall be able to grasp the idea of what persistent moral force will ultimately accomplish in the conformation of nature.

The Rectification of Nature by Mind is not a metaphysical idea, involving subtle disquisition on the natures of mind and matter, but a practical view taken from the summit of experience, where recognising the power of mind, as that faculty is commonly understood, to modify or change forms and conditions, and the probable effects of that power in the vista of the future, realises in the mind's eye the glorious prospect of a renewed world. Formative Ethics, therefore, seeks to define the right conditions and forms of phenomena, to establish the right ideas to which nature should be conformed.

The perception that the progress of knowledge is giving man a continually increasing power over nature to mould it to his will, and of the eternal and necessary quantitative predominance of good over evil, leads us at once to recognise the parallel which exists between the scientific prevision of a restored world and the restoration proclaimed in the prophecies and by Christianity. Moral science has to define what is right in thought, act, and being, in order that all nature may be reinstated in rectitude. The more one rightly and thoroughly knows, the clearer becomes the anticipated correspondence between the natural or scientific and the revealed moral law. Christianity and Formative Ethics lead us to contemplate the human race and the world as materials long since marred by ignorance or wilfulness, being re-made and conformed as right ideas see fit to make them,—restored to rectitude.

Before proceeding to formulate the science to a more detailed exposition of the hypothesis of Quantitative Ethics, it is important that the following brief summary of the results of ages of philosophical speculation should be grasped and understood. Philosophy, then, has decided and re-decided in recurring cycles, that we can only believe in or speculate upon, but never know, cause *per se;* that neither the existence of spiritual nor physical noumena can absolutely be demonstrated. All thinking men, however, believe that there are noumenal potentialities adequate to the production of, though hidden behind the veil of, phenomena. To these noumenal potentialities various titles have been given according to the moral or immoral tendency of the mind. In the one case, all effects are attributed to spiritual; in the other, to physical causes. The hypothesis of a noumenal motion and substance being the causes of all things is less probable than that of the spiritual, on the ground of its destructive social effects and practical disadvantages. A belief in a great First Cause, however, appears to be inherent in the human mind, and thousands of thoughtful lives have been spent in vainly endeavouring to penetrate the veil of ideas; the ever-recurring result being, that if philosophers are compelled to accept nominalism as a conviction, they always adopt some form of realism as a belief. Bishop Berkeley wrote an irrefutable treatise, proving that the existence of a noumenal substance cannot be demonstrated: he might also have as irrefutably proved that the existence of a noumenal physical force or motive cause is undemonstrable; so that the idea of physical causation, of materialism, which by some minds is thought to be so certain and positive, ultimately rests like that of the spiritual on belief. But in controverting and discarding this idea, he was compelled by a mental necessity to substitute belief for belief, and to attribute all phenomena to a spiritual cause, *i.e.* the will of the Creator.

Both the metaphysician and the physicist, then, fail in attempting to define and demonstrate the nature of causation; and the correct arrangement, classification, the right quantitative expression of ideas, and the correct observation and measurement of external phenomena are the more legitimate objects of science.

Let it be conceded, however, for a moment, and for the sake of argument, that the belief in physical causation is the right one; that all phenomena are so many various effects of a noumenal physical motion and substance; and the inevitable conclusion must be, that all phenomena are capable of quantitative expression, of being numbered or measured; that all exact science must be the knowledge of quantities, of definite proportional relations, for our ideas of force and substance are fundamentally those of degree and extension. The same inference, too, must be drawn from any metaphysical conception of cause, for metaphysicians have long since decided that our fundamentally intuitive ideas are those of space and time, which are really subject to still higher abstraction, and are ultimately, as in the physical idea, resolvable into quantity. Quantity, then, under either hypothesis, is the most abstract of comprehensible ideas: it is fortunately also the simplest, and forms under its symbolic expression of number and measure the surest basis of discussion.*

W. CAVE THOMAS.

* To be continued.

GERMAN HOSPITAL, DALSTON.

IT is estimated that there are upwards of 30,000 natives of Germany or of the German provinces subject to other states, resident in London and its neighbourhood, and contributing to the commercial, manufacturing, and professional activity and prosperity of the metropolis. Up to about twenty years since, many of the artisans and other humble classes of that nation, whenever they were ill and destitute of the most necessary comfort or medical aid, had to depend on parish assistance, finding themselves alone and deprived of the soothing attention of kindred and friends. Under such circumstances their wealthier fellow countrymen took steps to create an institution which should relieve such misery; and, seconded by the benevolent sympathy of the late king of Prussia, and of her Majesty Queen Victoria and the Prince Consort, they were enabled to open a hospital at Dalston on the 15th of October, 1845, in the presence of his Royal Highness Prince George of Cambridge and a numerous assembly of influential friends.

Three thousand pounds had been liberally advanced without interest, in equal shares by the late King of Prussia and two German merchants, for the purchase of the establishment at Dalston, originally occupied as the Infant Orphan Asylum. The committee secured the services of a matron and three nurses, from the institution at Kaiserwerth, near Düsseldorf, on the Rhine, in which institution, from religious principles, respectable Protestant females devote themselves to the task of nursing the sick, and are there trained as "sisters" or "deaconesses." The committee were soon joined by several English gentlemen zealous in the cause, and since that period above 150,000 sufferers have been relieved, whether as in or outpatients, of whom above one-third have been English; the average *daily* number of English outpatients amounting to about 100!

One valuable feature distinguishes this Institution: it has a sanitarium, or a part of the hospital where accommodation is afforded to German patients who are received on paying a moderate remuneration to the funds of the Institution,—a system which might with great advantage be more generally adopted than it is in the lunatic and other hospitals and infirmaries of this kingdom. The accommodation at the end of the first twenty years' probation proved inadequate to the increasing demands upon the resources, both from local and other claims upon the benevolence of the governors. The total number of cases relieved last year amounting to nearly 17,500, of whom 789 were in-patients and of them 141 English, these last arising from accidents, many of them heavy, expensive, and occupying the beds for a considerable time. A further appeal was made to the German committee and the benevolent English, who sympathised in their efforts, and the late Mr. F. Huth having made a munificent gift of 2,500*l.*, his example was generously followed, and steps taken to erect a new hospital; and Mr. Huth being requested to name the architect, he recommended Professor Donaldson, which was confirmed, and his plans for 100 beds adopted at a meeting held on the 16th of July of last year, presided over by his Royal Highness the Duke of Cambridge.

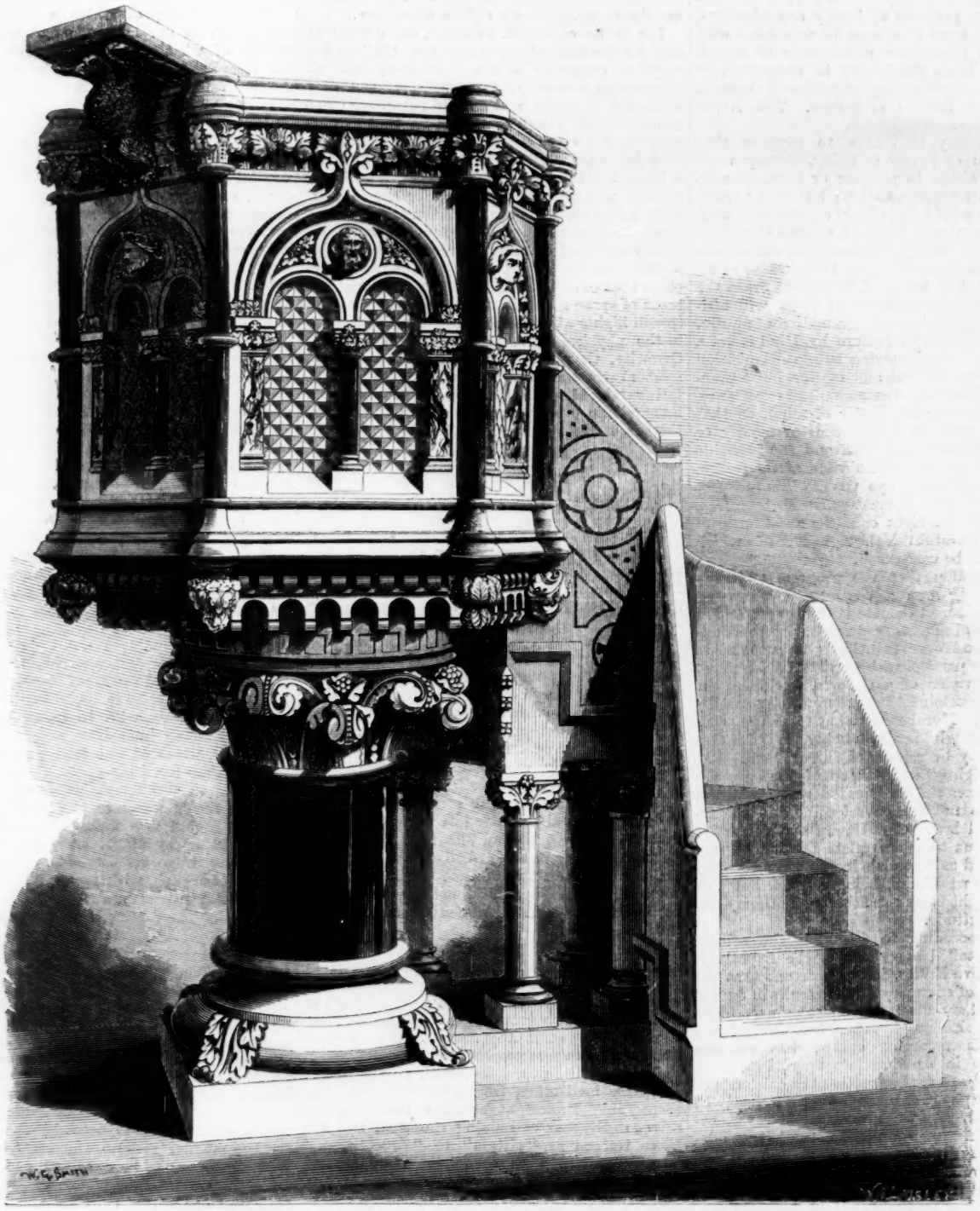
The building, of which we gave a view and plans in our last number,* stands in the centre of what was formerly the garden of the hospital, through which runs the North London railway. The soil is admirable in a sanitary point of view, consisting of gravel and sand to a great depth. The building consists of two blocks; the ward building, one of whose long fronts faces the south, and the north or residential building, containing the kitchen department, offices, medical and other officers' residences and "sanitarium rooms," for eight or ten patients. These two blocks are united by a corridor, which at the same time disconnects the wards from the residence of the officers. The wards have windows on both their long sides, to the north and south, affording a thorough ventilation, and are 15 ft. high in the clear, thus providing 1,500 cubic ft. for each bed. It will be perceived that each ward has at the end its scullery, containing ventilated water-closets, bath and other conveniences, and rooms for the nurse and sister. The ground-floor has the accident-ward for ten beds, with attached scullery and nurse's room, and to the out-patients waiting-room; these are capable of holding above 100 persons at once, besides an outer shed for the like purpose, near the entrance-gates. There are three consultation-rooms for the medical officers, a dispensary, laboratory, and lobby for out-patients in waiting, while the medicines are preparing. The chapel, 40 ft. by 25 ft., and 16 ft. high, with chancel, is at the east end, having over the communion-table a stained-glass window in memory of his Royal Highness the late Prince Consort, presented by Mr. J. Rahles, a member of the Board of Management, and the floor has an ornamental paving of Minton's tiles.

The staircase is 26 ft. by 13 ft., having flights of steps 5 ft. wide, with 12 in. treads and 6 in. risers, affording immediate and direct access to the wards, which on the first floor are divided into four, for ten beds each. These consist of the children and female wards on the one side, and the men's wards on the other; and of four sculleries, and two nurses' and one sister's rooms, 14 ft. by 10 ft. The second floor, or uppermost range, consists of two large wards, of twenty beds each, with two sculleries, and two nurses' and two sisters' rooms. In the attics are five rooms for male attendants or stores. There is a lift for raising coals, the dinners, or any other articles, from the basement to each floor, worked by Easton & Amos's hydraulic apparatus, and which, in case of need, is available for use by patients; and on each landing is a store closet. The basement has a bath-room, and vapour and sulphur bath-rooms, with capacious coal cellars. A corridor connects the ward-building on each floor with the northern or residential building, the basement of which is elevated to the kitchen and domestic departments, matron's stores, wash-house and laundry for the smaller articles, the chief bulk of the washing having to be done out of doors. The entrance-floor consists of the entrance-hall and staircase, committee, chaplain's, and secretary's rooms, matron's sitting-room, common or dining room for matron and sisters, medical men's common sitting and sleeping rooms, clerk's office, and a waiting-room on either side of the hall, the walls of which are to have enamelled slate slabs, inscribed with the names of benefactors. On the first floor are the operation-rooms and two surgical-cases rooms attached, sanitaria rooms for contributing patients, and bedrooms for the matron and sisters, with a storeroom for linen.

The building has been carried out by Professor Donaldson, with the co-operation of Mr. Edward A. Gruning as his colleague. Messrs. I'Anson are the contractors for the building; the cost of the structural part and some of the fittings amounting to about 12,500*l.*; the out-buildings of porter's lodge, dead-house, and post-mortem rooms, shed, and coach-house, 1,050*l.*; the cooking apparatus, by Riddell, 125*l.*; the heating apparatus of the wards, baths, and sculleries, by the London Heating and Ventilating Company, 244*l.* 6s.;† the lift, 180*l.*; gas-fittings, 176*l.* 10s.; and bells, 52*l.* 10s. Some few minor fittings have yet to be arranged for.

* See p. 546, *ante*.

† The warming will be effected by means of the "Gurney" stoves (as used in St. Paul's and various other buildings), and open-fireplace fresh-air grates. These grates admit the external air over the back of the grate, and it thus becomes thoroughly warm before entering the ward.



PULPIT, CHRIST CHURCH, DEPTFORD.

Designed by Messrs. Newman & Billing: executed by Mr. Seale, Sculptor.

PULPIT, CHRIST CHURCH, DEPTFORD.

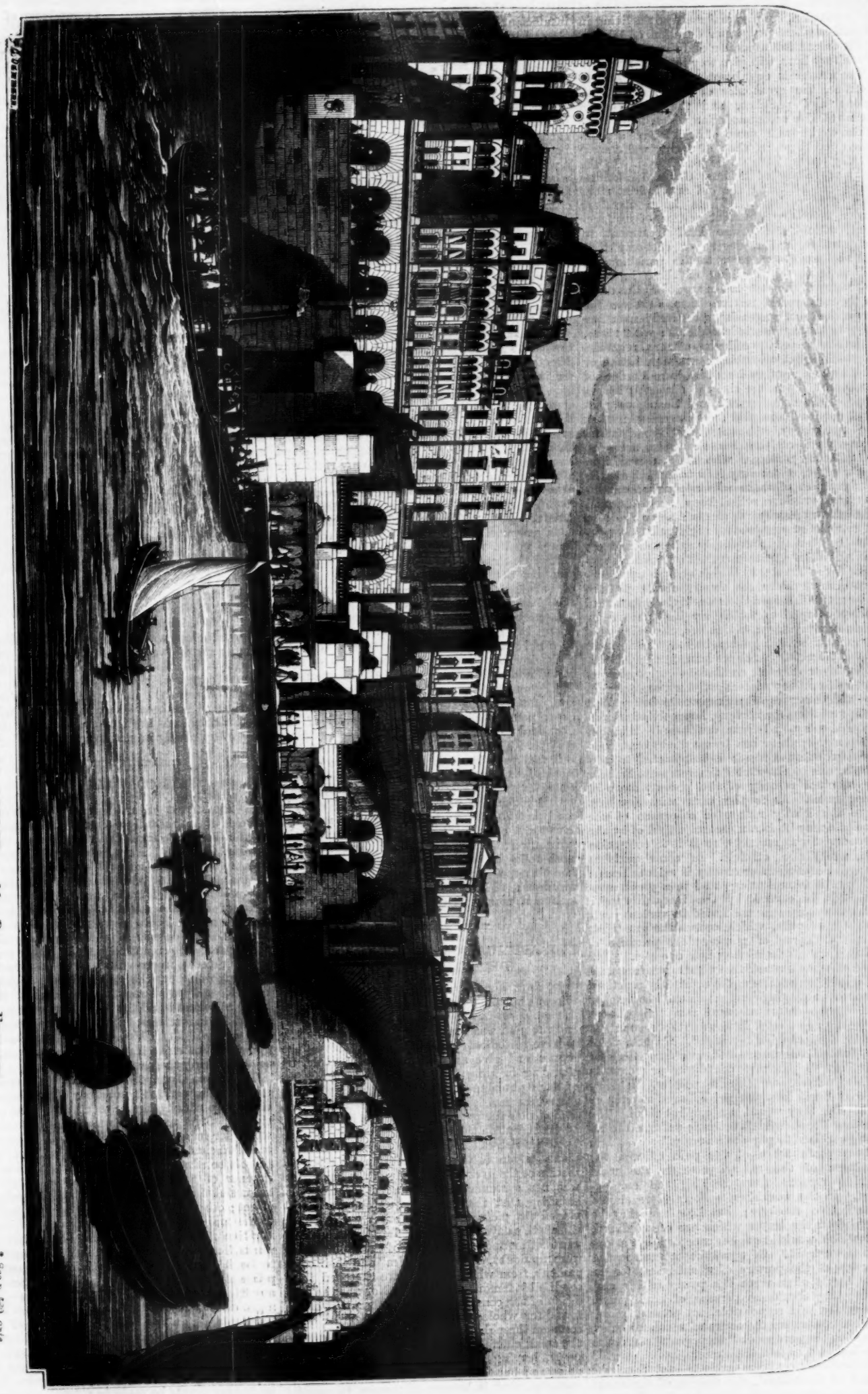
THE accompanying engraving represents the pulpit in Christ Church, Deptford, designed by Messrs. Newman & Billing, architects, and executed by Mr. J. W. Seale. The principal portion of the pulpit is Caen stone, with a polished Aberdeen granite shaft. The columns in the upper part are Devonshire and Irish red marbles. The book-stand and pilasters are of Derbyshire alabaster. The five medallions represent Christ and the Evangelists.

THE POOR OF THE METROPOLIS.

MORE deaths and more misery in Bethnal-green! Some inquiry is necessary. The changes which are taking place in the condition and arrangements of our population are surprising, and call for new measures which may meet the difficulties now constantly arising in consequence of these alterations. It is impossible, with justice to all classes of the community, to continue old-fashioned management. With all our changes, the poor shall not cease in the land; in fact, it is unfortunately the case that, notwithstanding the general prosperity, there is an amount of helpless destitution to be dealt with which it is frightful to think of.

One peculiarity of our present position is, that the increased growth of the towns, the gathering together of the people in certain situations, is causing the poverty to be concentrated into these particular quarters, where it is left without that voluntary aid, which, in more limited populations, affords the means of enabling persons to bridge over temporary difficulties. For this and several other pressing reasons an inquiry into the condition of the metropolitan poor is called for, which would enable us to see clearly how the matter stands. In the course of such an inquiry it would be needful to ascertain the effect which the removal of so many houses formerly inhabited by the poorer classes has really had in increasing the extent of overcrowding; the amount of rent, and other facts, which should be gathered on a more extensive scale than it is possible for private individuals to manage; and other circumstances connected with the dwellings which materially affect the life and health of a great multitude. It is also needful that the working of the present system of the Poor-laws should receive very careful attention; for what is especially wanted just now is a collection of facts, which can be put to use by able persons who are unbiassed in their opinions by routine, or by interested or other motives.

The inquiries which have been made by the Poor-law Commissioners at Bethnal Green will, to a certain extent, be productive of good, inasmuch as they will show the manner in which the evil works, and in a certain degree indicate



THAMES EMBANKMENT: LANDING PLACES, WATERLOO BRIDGE.—MR. BAZALGETTE, ENGINEER.

* See p. 520, *ante*.

the nature of the changes which should at once be made. It is hoped that the ill-feeling exhibited by the guardians here, not only to the pauper part of the population, but also to those who are living in situations where the proper duration of life depends on careful inspection and the enforcement of sanitary laws, will give way to a wiser policy.

The matter is one beset with difficulty; for instance, the great size of the metropolitan unions and parishes, and the proportionate extent of the accommodation which is required in the workhouses, some of which have a population as large as that of many well-known country towns, have to be considered. In the infirmary alone of Bethnal Green Workhouse there are, including the old and infirm, more than 400 patients. These large numbers render necessary a perfect system of management, which will insure kind treatment to the inmates, and a degree of economy that will not prove oppressive to the parishioners; and it is to the clashing of these interests that many of the complaints are to be attributed. On the master and matron, then, devolves the heavy charge of preserving order and preventing waste in these gigantic households: with these, in the absence of the relieving officers, rests the responsibility of admitting casual applicants or others who are unprovided with formal orders of admission. There are also the chaplain, house-surgeon, the schoolmaster and the school mistress, one or more paid superintendent nurses, who are chiefly entrusted with the internal management of the house: there are also the relieving officers, who seldom reside on the premises, whose duty it is to investigate the circumstances of those who apply for both in-door and out-door relief, keep accounts, and make the necessary payments: there are also the pauper nurses, cooks, night and day porters, &c.; but it is to the Board of Guardians that all these officials are in the main responsible. It is the Board which decides upon contracts for provisions, &c., fixes the extent of the rations, and should in their weekly rounds attend to any complaints which are justly made by either old or young: to this body the charge of any general or extensive mismanagement must be laid. Therefore, when we hear, in any particular parish or district, continual charges made of wholesale sanitary neglect; of poor people perishing with hunger; of sick persons being kept waiting at the door for long hours for admission during the day, and those destitute in the night turned away; there can be no doubt that, however much blame there is to be attached to individuals, it is to the Board that we must look for any effectual remedy of the present state of management. As is the case with families, where the kindly nature or otherwise of the principals may be in a measure judged of by the behaviour of the servants, so is it in connexion with workhouse officials. In some parishes complaint of neglect or cruelty is seldom heard: in others it is unceasing; and in a great measure this is caused by the inequality with which the poor-rates are levied in various parts of the metropolis, which causes the guardians to use a degree of parsimonious pressure of which some of them may not approve. But much of what is considered a saving is an actual loss: take, for instance, the commonly practised system of employing pauper nurses. The damage done by this means amongst the young of both sexes who are reared in these establishments is greater than can be calculated. On this point Mr. Farnall remarks:—"It was impossible for guardians to put any confidence or trust in pauper nurses, or unpaid officers. If they knew as much how paupers behaved to paupers as he did, they would not employ them. The Poor-law Board had left no stone unturned to induce guardians to pay their nurses."

As regards some of the paid officers, the smallness of the salary prevents the most suitable persons from seeking the employment. In the workhouse schools there should be effective teachers; but how can they be obtained on the terms which are often offered, and which would not be accepted by a decent housemaid? Of equal importance is the selection of the porters of workhouses, for in their hands often rests the power of life and death: they should be persons of intelligence, who can be held responsible. At present, many of these officers are the cause of much mischief, and often they are made "scapegoats" for faults which should be laid elsewhere.

After looking at the subject,—not from the Board of Guardians', the master of the workhouse's, or the relieving officer's point of view,—but with a view of the immense destitution and misery which exist, and knowing in how many instances the present system of poor relief is insufficient for its purpose, we ask, at the least, that an inquiry should be made into the present condition of the many thousands who are now suffering. It is not right that the poor, when in actual starvation, should declare, as we have many times heard them, that "they would rather die than go into the workhouse;" or that in time of temporary but great distress relief should be refused unless the poor furniture of a house be sacrificed, or those who are able to earn a part of their living are forced into the workhouse, where men, women, and children are separated, and where the persons thus treated (at the rate of fifty and upwards per cent.) become perpetual paupers, evermore chargeable to the rate-payers and comparatively useless to society.

PROPOSED GOVERNMENT MEASURE RESPECTING THE CASUAL POOR OF THE METROPOLIS.

FOR many years past, in our notices of the condition of the London poor, attention has been often directed to the inadequacy of the present system for the relief of casual destitution. The unequal way in which the plan works has been shown; how hardly it bears upon the poor; and how heavily it presses upon the parishes which are inclined to do their duty. We have carefully observed the effect of the arrangement; and have long been of opinion that the only right way of meeting the evil is the provision of *places of refuge*, supported by a fair rating, in proportion *to rental, of the united metropolitan parishes*. It is satisfactory, therefore, to find that a movement is in progress which seems likely to carry out these views. The proposed Bill sets forth that the metropolitan parishes should make out separate accounts, half-yearly, of the amount of relief given to the houseless poor between the hours of eight p.m. and eight a.m. The account is, on being submitted to and passed by the official auditor, to be transmitted to the Metropolitan Board of Works, who are authorized to pay the same out of the moneys raised under the powers of the Metropolis Local Management Act, such payments to stand as part of the expenditure of the Board. The Bill gives power—subject to the approval of the Poor-Law Board,—for parishes to construct refuges. There is but little hope that this Bill will pass through the Parliament of this session, but we hope our legislators, even when they are in pleasant and healthful places, will think of the vile conditions which exist in the heart of England, and consider not only how they can ameliorate the disgraceful circumstances, but strive for things far better than most folks at the present time contemplate. The Metropolitan Board have declared their unwillingness to have anything to do with the collection of money for the purpose.

THE APPLICATION OF SCIENCE TO THE DETECTION OF CRIME.

IN days gone by, when the neglected condition of the police was notorious, the detection of the most serious crimes was almost impossible, and the plan was for the City officers of the law to have periodical "field-days" to gather up the rogues and give an example to the whole, by chancing to hang up those who were deserving of such punishment. For a long time the trial for secret murder was not dependent upon the evidence or the production of links in the chain of facts, but on the ordeals of touch and fire, or upon the risk of the victory of contending champions. Even in the reign of Henry VIII., protection of the lives and property of the Londoners was not systematically arranged for, notwithstanding that the marching watch yearly displayed its picturesque pageantry. In Queen Elizabeth's days the state of affairs became somewhat better, and in the streets of the capital there were, no doubt, the "Dogberries" and their companions, from whom Shakspeare sketched from the life his famous characters. Nor was the condition of the country any better than that of the town, for wholesale robbery and murder were common throughout the land. Along the Borders the small chiefs afforded a feeble security to property, levying a tax upon their neighbours for doing so; but this was such a frail and uncertain security, that it became necessary to appoint wardens of the marshes, for the purpose of keeping this voluntary police force in order. As time passed on, the slow-moving night-watch did but little either to prevent the commission of crime or to bring the guilty to punishment. There were also the beadles of the City wards, whose office it was to act as constables, and keep a check over evil-doers; but it was not until the days of Jonathan Wild and Townsend that thief-catching began to be considered as a science; and a combination of persons both in and out of uniform, under the direction of a clever head, became a means of detecting the perpetrators of offences which otherwise would have escaped punishment. Since the time mentioned, the detective police force has greatly extended, and at one time had an over-good character. Means are provided far more certain than the blood-hound to hunt down the robber and the murderer. If the offender be aided by the speed of the locomotive, there is the electric telegraph against him, which is more rapid still; and great was the surprise of all when this agency led to the apprehension of Tawell, the Quaker. Since then many who have done wrong, and who trusted to the swiftness of the rail, have been caught, both to their confusion and surprise. Besides this, photography has been called into use with excellent effect. By this means the portraits of many of whom the police were in search have been multiplied, and sent to all the stations in the metropolis, and throughout the country. In several of the prisons, photographs of those who are likely to be again "wanted" are taken and kept for the purpose of identification. In the case of the supposed murderer of Mr. Briggs, a photograph given by him to an acquaintance, afforded the opportunity for Mr. Death to identify him as the person who exchanged the gold watch-guard for other property; and now, by the power of the steam-engine, the mail-packet will outspeed the sailing-ship *Victoria*, on board of which the murderer is believed to be; and by the time he reaches New York, the police and those who are able to apprehend him will, it is to be hoped, be in waiting for his apprehension.

Nevertheless, with all these aids the police are losing reputation; and, as it seems to us, not unjustly. We fail to discover the exercise by them of any real acuteness; and, indeed, know of cases where the greatest negligence, to use no worse word, has been shown when no reward had been offered. A Parliamentary inquiry before long will probably be necessary.

SCHOOLS OF ART.

A DEPUTATION of managers and masters of Schools of Art recently waited on Earl Granville, at the Privy Council Office. It was headed by Mr. Beresford Hope, who dwelt upon the points which the schools desired the Committee of Council to take into consideration before any new minutes founded on the recommendations of the late select committee of inquiry were issued. These were mainly that there should be an extension of the meaning of the term "artisan," so as to include small tradespeople, clerks, apprentices, &c., and that the schools throughout the country might be cheaply and efficiently worked with an amount of direct State aid equal to all the fees and subscriptions raised by the schools themselves, viz., 20,000*l.*, as against 46,600*l.* claimed by the Department of Science and Art to have been spent upon the schools during the past year.

The Select Committee on Schools of Art have embodied in various resolutions the recommendations to which they have agreed. The principal of them are:—"That a central training school for teachers be maintained as at present, and sufficiently qualified scholars from local schools be admitted to the training school at the expense of the State, the study of decorative art useful for manufactures being the primary object; other scholars should also be admitted to the training school upon payment of remunerative fees. That a national competition of works from all the local Schools of Art continue to be held annually at South Kensington, and prizes awarded. That the conditions of granting any State aid to local Schools of Art be:—That night classes for artisans be open at least three times a week, at fees within the reach of artisans; that the teachers be certified, and receive the whole of the fees of the artisan classes; and that the localities provide suitable premises, and pay all charges for rent, taxes, and repairs. That no further grants be made in aid either of building or fitting Schools of Art.

MOSAIC WORK IN ST. PAUL'S CATHEDRAL.

On Friday, the 22nd, while the big clock was striking three, the covering was removed from the first of the mosaic pictures with which it is proposed to decorate, as funds become available, the interior of the metropolitan cathedral. It fills one of the eight spandrels of the arches under the dome (the south-western), is inscribed "Isaiah," and was executed by Signor Salviati (who, as our readers know, is also at work at Windsor), after a design by Mr. Alfred Stevens, and under the general direction of Mr. Penrose. The cost, including the design, if the area covered be as stated, about 300 feet, will be something under 2*l.* 10s. per foot superficial. The picture consists of three figures: the prophet seated regarding a tablet held by an angel to the left of the spectator, and a second angel on the right holding another tablet, and which may be intended to convey that by spiritual interposition Isaiah was enabled to give forth prophecies to the world. The back-ground is of gold. Some indistinctness in the design is caused, especially when the light in the building is not very good, by the absence of those bright lights and strong shadows which are to be found in the ancient mosaics, and which are needed in all pictorial representations intended to be seen from a distance. Thus the tablet held by the angels mixes up with the figure in both cases. The piece of floating drapery from the shoulder of the angel on the left side, is open to cavil, and the same may be said of the perpendicular line formed by the leg of the prophet against the couch. Nevertheless, as a whole, it seems to us a successful first essay: there is a certain grandeur about the composition, and the colour of the lower portion of the picture is harmonious and pleasing. We sincerely hope that money will be forthcoming to admit of the continuation of the work.

AYLESBURY CORN EXCHANGE AND MARKETS.

The foundation stone for this building was laid on Wednesday, the 13th inst., by Lord Carington.

The building, which is to be in the Elizabethan style, will be faced with red bricks and Box ground-stone dressings. The front will consist of three archways, the centre one for carriages, 18 ft. wide; and the other two for foot passengers, each 7 ft. wide, supported by pillars. The passage through these archways will lead into a new road which will open a thoroughfare. Above the archways will be two rooms separated by sliding doors; and, when thrown into one, forming an assembly-room, 42 ft. by 33 ft., with retiring-rooms and other conveniences.

The front contains a bay window, surmounted by an ornamental gable with a clock-face and Elizabethan terminals. This part of the building will be entered by a stone staircase on the left-hand side of the archways, surmounted by a mansard roof with a cresting. The Corn Exchange will stand at right angles with the archways. The building will be 90 ft. by 45 ft. in the clear, the roof being supported by semi-circular wrought-iron ribs, the spandrels filled in with tracery. The height in the centre will be 48 ft. Light will be afforded by a skylight extending a distance of 70 ft. along the centre of the roof as well as by clerestory windows. The construction of the walls will be peculiar: it is designed to economise space, and to resist the lateral pressure of the roof. The space between the buttresses will be enclosed, and form offices for corn dealers and others, to the number of twenty. At the end nearest the archway will be a gallery approached by the staircase before mentioned: at the farther end will be the orchestra.

Between the Corn Exchange and the general Market will be a kitchen, scullery, and butler's pantry for use on the occasion of public dinners. There is also an office which will probably be let with the wine-cellars under the market, and a tap for the sale of beer. The general market in the rear of the building will extend along the side of a new road. This building will be 112 ft. long and 61 ft. wide, and covered with about two-thirds slates and one-third glass. The roof will be in three spans, and supported by iron columns 14 ft. high, with ornamental brackets.

The contract price for the buildings, exclusive of the kitchen arrangements, cellars, and fittings, is 7,064*l.* The architect is Mr. D. Brandon; the builder, Mr. E. Conder; and the clerk of the works, Mr. G. French.

"THE EXHIBITED MACHINERY OF 1862."

With reference to part of our recent notice of this book, touching the projectile theory of boiler explosions, Mr. D. K. Clark requests us to insert the following portion of a letter from Mr. Colburn, which he considers a distinct acknowledgment of the justice of his claim: with this request we willingly comply:—

"*Nov. 23rd*, 1859.

About the Boiler Explosions, I am ashamed to say I have done nothing yet. I intended to adhere to the arrangement we made the last evening I was at your house; but I have additional ideas on the subject, which have kept me thinking over the theory still more. I think it will all be clear enough, though, and that its publication can be brought into a moderate compass. Our names appearing, as was understood between us, I should rather prefer that *you* should write a brief introduction, stating the share of each. I believe I was the one to suggest the disengagement of the steam from hot water. You confirmed my belief in several ways; and you have given me nearly all I knew of the action of steam by momentum. My views on decomposition, electricity, &c., are borrowed, and I lay no claim to originality in them. I hope to go at it soon."

Mr. Clark adds,—"As I have often before proposed, I am quite ready to talk over the matter with Mr. Colburn, in the presence of witnesses, to settle any little discrepancies of evidence."

Another correspondent on the same point asserts that the leading features of the theory will be found "stated in a paper by Mr. Sewell, Assoc. Inst. C.E., which was read by Mr. Wm. Fairbairn, of Manchester, before the British Association, and was afterwards published in the *Mining Journal* about 1853." We are not disposed, however, to pursue the controversy.

Touching another portion of the book referred to in our review, we print the milder portion of a letter from another commentator:—

Had the author confined himself to the description and delineation of the various machines, the objects of such a publication would have been better served; but in one department, at least, that of hydraulic mechanism, he has thought proper to contrast the merits of two centrifugal pumps, which, perhaps, attracted more popular attention than any other items of the varied mechanical display: one was the patented invention of Mr. Gwynne, as manufactured by his firm; the other being Appold's pump, as manufactured by Messrs. Easton, Amos, & Sons. He proceeds to discuss the merits of both; depreciating the former and lauding the latter; jumping at once from the position of compiler and commentator to that of a zealous partisan. Computations in favour of Messrs. Easton's Appold pump set forth an excess of performance, which that firm did not claim for themselves: he alleges that Messrs. Easton's pump, at a speed of 124 revolutions per minute, threw 184 tons of water! whilst Messrs. Easton themselves state, as published in the Illustrated Exhibition Catalogue, that their pump, at a speed of 118 revolutions per minute, threw 100 tons of water.

Mr. Clark's position of Superintendent of the Western Annexe, together with the authorship of the announced publication on its exhibited contents, invested his *dicta* and opinions with some importance. On the other hand, one of the firm of Messrs. Easton, Amos, & Co., was engineer to the Royal Agricultural Society, and as constructive engineers, they supplied water to the Horticultural Gardens, and to the Exhibition itself, being contractors as well as competitive exhibitors.

Apprehensive of the effect of partisanship, Messrs. Gwynne appealed to the Jury of the International Exhibition of 1862 to have their patent centrifugal pump carefully tested, offering to bear any expense incurred; but the jury refused. The patentees then engaged Mr. Z. Colburn, editor of the *Engineer*, to make report thereon. That gentleman made the examination, testing both Messrs. Gwynne's centrifugal pump and Messrs. Easton & Amos's "Appold" pump; "having ascertained the efficiency of each, both as to the absolute discharge, and as to the proportion which the useful work done might bear to the power expended:" the epitome of computation is as follows, viz.:—

"As compared with the full theoretical efficiency of 100 per cent., Messrs. Gwynne & Co.'s pump reached 11½ per cent. nearer to this than Messrs. Easton's 'Appold' pump, and, as compared directly with Messrs. Easton's 'Appold' pump, Messrs. Gwynne & Co.'s did 16 per cent. more work in proportion to the power applied."

In addition to this attestation, various professional gentlemen gave their approval of the computations, and acquiescence in the results.

M. A.

STATUES BY MR. STORY.

Messrs. Jackson & Graham, of Oxford-street, have in one of their rooms at this moment two very interesting statues by Mr. Story, who exhibited "Cleopatra and the Sybil" in 1862. One, a sitting figure, is called "Sappho;" the other, standing with upraised right hand, the left holding a sword, "Judith." The face of Sappho is not that of a Grecian, but is one, nevertheless, saddened, it may be supposed, by her unrequited love for Phaon, that fixes and delights the spectator. The drapery is admirably disposed (as is the case with the "Judith"), but the hands are over large. Great manipulative skill is shown in both. Notice, for example, the manner in which the Etruscan necklace worn by Sappho is wrought out of the marble, and the treatment of the back of Judith's head.

THE PROPOSED O'CONNELL MONUMENT.

The question of a monument, of which a statue should form a chief part, to the memory of the late Daniel O'Connell, is again being agitated. It is proposed to collect and spend on this object a sum of 10,000*l.*, of which nearly 6,000*l.* are stated to have been already realised.

It has been decided, almost unanimously, that the artist should be a fellow-countryman of the person commemorated.

On referring to the discussion at a late meeting, held on the 6th inst. in the City Hall, Dublin, the committee divided on the advisability of holding non-resident Irish artists eligible for competition. In connexion with the proposed monument, several names have been mentioned not unknown to fame; foremost amongst them Mr. Foley and Mr. MacDowell, non-resident; Mr. Farrell and Mr. Kirk, resident in Dublin.

Mr. Foley has, we have heard, already been consulted on the subject by the committee or some individuals of it. This act has been the cause of dissension, it being thought by others not quite proper to let the work be executed out of Ireland, which would probably be the case were Mr. Foley, the artist, employed.

It has been stated that Mr. Foley has declined to compete, should the final decision of the committee authorise a competition. Mr. MacDowell, however, has expressed himself willing to do so.

At the late meeting already referred to, on a show of hands at the close, the original resolution was carried by a small majority against an amendment in favour of giving the work directly to Mr. Foley.

The resolution is as follows:—

"That while the committee are advised that it is likely some of the most eminent Irish artists will not contribute designs in competition for the prize, they deem it advisable to afford opportunity for the widest possible exercise of genius in the production of the design, and to that end advise the committee to invite designs by competition; reserving to themselves, meanwhile, the power of ordering a design from an artist or artists of eminence to be selected by the committee, should they decide on adopting this course. That the following prizes be offered for designs for the O'Connell Monument, by Irish artists, architects, and others. For the first in order of merit, 100*l.*; second, 60*l.*; third, 40*l.*; the design to be in accordance with the following instructions and conditions:—'The Statue of O'Connell to be the most prominent feature in the monument; statuary groups or bas-reliefs to form features of the structure; the monument to be designed on an estimate of the minimum sum of 10,000*l.*; the design to be a sketch model on the scale of 1 in. to the foot. The ground granted for the site is 20 ft. square, and it is probable that a larger space in length, though not in width, may be obtained if required. Models or designs to which prizes may be awarded shall be the property of the committee. The committee will not be bound to accept or award prizes to any of the designs that may be sent in.'"

SANITARY PRECAUTIONS.

Let us again, if it be not already too late in the hot season, offer some advice on this most essential point. The summer heat, especially with the great drought of the season, makes all outdoor pollution the more dangerous, and necessitates the greater sanitary care. In all instances it is needful, at this time of the year, to examine carefully what is deficient, and also to see what improvement can be made, both in town and in country, for the preservation of life and health; especially in those places to which the pent-up Londoners and others living in large cities are wont to flock for the enjoyment of fresh and pleasant breezes. In these days the heads of families look at the death rates of the various "Health Retreats," as they are often wrongly called, before they entrust those who are dear to them to such retreats. At the seaside or other spots, occasionally, more actually

die per thousand than die on the average in the metropolis, and some other thickly populated towns. It is, therefore, to the interest of all connected with property in these neighbourhoods, by improved drainage, by the construction of good and well-arranged dwellings, and by a proper system of scavenging, to make them what they really would be but for the impurities occasioned by neglect.

From time to time we have looked with care at the annual death-rates given in the reports of the various localities, and, with pain we must say, have noted the terrible difference which exists in places that have the same natural advantages, and the means of prolonging life and promoting health. We do not allude just now to those spots where persons in the last stages of consumption, and some other fatal diseases, are often taken; but to those where people in the ordinary state of health are in the practice of going in large numbers; and it is a sad fact that in many such places the annual death-rate is frequently from eight to ten, and even more, in the thousand per annum greater than it ought to be.

An examination of the Registrar General's valuable reports shows that in those health-resorts, when the authorities have gone properly to work, there is the sure consequence of a decrease in the annual number of deaths; and it is to such real "health-retreats" alone that sensible fathers of families send their wives and children, and go themselves as often as they can spare time from their busy city pursuits.

If the Registrar-General were to prepare a list of the chief places to which persons resort for summer recreation; and, against each, place the death-rate, and its increase or decrease for the last ten years, such a list would be most valuable. It might be suspended in the hall at the office in Somerset House, to be easily inspected by those interested; or even more good would be done by preparing such a list annually for the press, at the season when the swallows come, and the "leafy month" is at hand.

The drought of the present season is believed to be greater in some districts of the country than it has been for forty years. Pasturage is dried up, and cattle are already being fed on the new and scanty crop of hay. As regards the washing away of the festering pollutions of summer, this drought is a most serious matter, and betokens great evil to health and life in the autumn; more especially as there has also been a want of thunder-storms to "clear the air," and assist, with their vivifying ozone, in promoting the scavenging decomposition and dispersion of animal and vegetable refuse. All the more, on this account, too, is there pressing need of active sanitary measures of a preventive nature at the present moment.

RAILWAY MATTERS.

WE hear that the directors of the London and South-Western railway have given instructions for placing a glazed aperture in each division of their carriages, such as was recommended in the *Builder*. They will be circular, and provided with curtains (?) so as to insure privacy to the passengers, but will, at the same time, in the event of an assault by one individual upon another in any one of the carriages, afford to the occupant of an adjoining compartment the means of identifying the offender.

A correspondent, "T. A. S.," suggests a simple and practical means of communication between passengers and guards; but such means have over and over again been suggested and been laid before the directors and managers of railways. It is not from want of practical and simple means that some such communication has not been long ere now established between passengers and guards. We have often, and for many years, insisted, that the only really satisfactory mode of communication between passengers and guards would be by the formation of what we called a watchman's beat, either outside or inside, so that the guard,—who would really then be a guard, and not himself a helpless prisoner,—would regularly traverse the train, as a duty, while in transit. This, however, would occasion a little remodelling of railway carriages, and perhaps a little re-arrangement or re-construction even of the line itself as regards the width of arches, the position of posts, &c.; and directors doubtless have the fear of the cost in view. So long as a guard or driver runs the risk as he now does of having his head smashed if he only thrust it out a little to one side of his train on the out-look for accidents, there seems to be a difficulty in forming an outside beat along the sides of the carriages; and as for the interior, although such is already the case in America, and occasionally on the Continent, new sets of carriages must with us be made to meet the object in view. The suggestion of glass compartments is, perhaps, the next best, although that does not enable passengers to stop the train, and might not, on occasion, even prevent murder,—as by a madman, for example; although it would certainly produce a wholesome influence on murderous villains in possession of their reason and their senses, if there be any such.

At the Sheriff's Court, Red Lion-square, a few days since, a special jury awarded 18,000*l.* to St. John's College, Cambridge, for some property at Cow-cross, required by the Metropolitan railway.

A locomotive coming from Spain has passed through the Pyrenees into France along the new series of tunnels. The official inauguration of the line is fixed for August 15.

The traffic receipts of railways in the United Kingdom amounted, for the week ending the 9th of July, on 11,308 miles, to 663,892*l.*, and for the corresponding week of last year, on 10,911 miles, to 610,648*l.*, showing an increase of 397 miles, and of 53,244*l.* in the receipts.

THE GLOUCESTER SURVEYORSHIP.

AT the last quarterly meeting of the Local Board of Health, the clerk read the report of the committee appointed to consider the applications for the office of city surveyor, &c. Of the twenty-eight candidates the committee had selected four,—Mr. Fowler, assistant borough surveyor at Leeds; Mr. John Richardson, surveyor to the Barnsley Local Board of Health; Mr. John Ross, assistant surveyor at Bradford; and Mr. Jowett, in charge of the works at Dorchester. Of these four they especially recommended Messrs. Fowler & Richardson; and, upon a division, the votes were thirteen for Mr. Richardson, and four for Mr. Fowler, one member declining to vote. Mr. Richardson was, therefore, elected to the surveyorship and the offices connected with it, at a total salary of 250*l.* a year. The following resolution was also unanimously passed:—"That Mr. McLandsborough's resignation be accepted, and that the thanks of the Board be presented to him for the manner in which he has performed his duties during the three years he has held his office, and for the zeal and attention he has shown in carrying out the various works undertaken by the Board, and generally for the services he has at all times readily afforded in the management of the corporation property."

COMPETITIONS.

Wyggeston's Hospital, Leicester.—The design marked "*Desideratum*" has been selected. The author is Mr. Thos. Chas. Sorby, of London.

Chester Town Hall.—The designs, twenty-nine in number, were referred to Mr. M. D. Wyatt, who has reported on them and recommends the one marked "Love's Labour" for the first premium (100*l.*), and that marked "Deva," in black ink, for the second (50*l.*). Touching the cost, Mr. Wyatt says in his report:—

"To state the case broadly, from a careful computation of the cubical areas of many of the schemes, it would appear that of those really affording the accommodation prescribed, the most compact of all require about three-quarters of a million cubic feet of building. The most extravagant of all—that of 'Red Cross'—rather understated, demands about one million and a quarter; and that the average, under which 'Love's Labour' slightly falls, would involve (belfry included) about one million cubic feet. There is nothing peculiarly extravagent in the style of work proposed by the author of 'Love's Labour,' and I therefore unhesitatingly recommend it for adoption, in the full belief that, whether its cost exceeds or not the sum named in the instructions as the probable limit—16,000*l.*—it would not cost more than would any other design worthy in any respect of realization.

Next to 'Love's Labour' I have placed the design under the motto 'Deva,' in black ink. Had the first-mentioned not have presented itself, I believe you would have had a satisfactory structure if this design had been selected for execution. The exterior would have been picturesque, English, and civic-looking. The plan is to be commended in every particular, excepting a few, which might probably be easily remedied on revision. I think it very good, but still, considerably less good than 'Love's Labour.' After these two, but at a considerable interval, I should place in order of excellence for various good qualities, 'Cheshire,' 'Civium,' 'Non nobis Domine,' 'St. Werburgh,' and 'Elizabethan.'"

Hexham Corn Markets.—Are any of your readers aware what decision has been arrived at by the directors of the above building? It is now more than two months since the designs were sent in, and a competitor asserted, a fortnight since, the premiums had been awarded.

ANOTHER COMPETITOR.

A GYMNASIUM.

LIVERPOOL.

THE first stone of a new gymnasium has been laid in Myrtle-street, Liverpool, nearly opposite the Philharmonic Hall. The building will occupy 1,450 square yards. On the principal floor, on the level of the ground, are the entrance-hall, 12 ft. wide; gentlemen's room, committee-room, ladies' room, bath-rooms for ladies, bath-rooms for gentlemen, lavatories, store-room, professor's room, office, and the gymnasium proper,—an apartment 105 ft. long, 75 ft. wide, and 45 ft. high. There are twelve dressing-rooms attached. There is a wide gallery at two sides and one end of the gymnasium, generally used for the various exercises, and intended for spectators on grand occasions. In addition to the floor space there is a space of 105 ft. long by 28 ft. wide provided in the roof for trapeze and other exercises requiring and imparting steadiness and nerve. On the first floor there are the school of arms, a room 50 ft. long, 27 ft. wide, and 15 ft. in height; an armoury, dressing-room, and porter's apartment; and in the towers, store-rooms, tanks, and porter's rooms. The basement contains work-rooms, cellars, apparatus-room, &c. There are two separate main staircases, and the rooms for the sexes are completely detached. There are handsome arcades between the school of arms and the gymnasium, connecting them, and adding to the vista and general effect. The windows are at the sides and ends, close to the roof, leaving the walls free for ornament and for fixing the apparatus. The light being admitted from so great a height, there will be an air of privacy and seclusion in the gymnasium. The building will be warmed by hot-water apparatus. The elevation towards Myrtle-street will be in the Italian style, and will consist mainly of a low centre, with towers at either end 60 ft. high. This elevation is to be wholly executed with rubbed stone. Its frontage is 94 ft. Mr. Walter Scott is the architect, his designs having been preferred in a competition. This plot of land, containing 1,450 square yards, has been purchased for a sum of 2,539*l.*, on corporation lease. The contract for the whole building has been taken by Messrs. Nicholson & Ayre for 7,060*l.*; and they have bound themselves to finish the interior, the hall, and the school of arms by the 1st of November, and the whole building by the 21st of December.

PRESERVING TIMBER FROM DECAY.

EXPERIMENTS by Mr. Crepin are recorded in the *Annales des Travaux Publics de Belgique*, in connexion with Baltic timber creosoted by Mr. John Bethell's process. In October, 1857, creosoted fir, which had been taken from wood prepared in the ordinary way for the State railway, beech prepared with sulphate of copper, and fir and beech not prepared in any way, were placed 6 ft. 3 in. (1·90 metre) above the water-mark upon the piles of the east pier at Ostend. In the beginning of January, 1859, the pieces were taken down and inspected. It was found that the piece of fir unprepared was much perforated by the teredo; that the piece of beech unprepared was perforated from one end to the other; that the pieces prepared with sulphate of copper were all three eaten by the teredo; and that the three pieces of creosoted fir alone were intact, and without a trace of the teredo. Mr. Crepin concludes that he cannot too strongly recommend the use of creosoted fir wood in hydraulic engineering, in preference to oak; since, in addition to its being cheaper, there is no doubt of the creosoted fir lasting longer. The Government Public Works Department has adopted this process, and constructed part of the dyke, and the whole of the American foot-passengers' bridge, in the new works at Ostend, of creosoted red fir. A report of Mr. Moir, with respect to the piles and other timber in the pier at Leith Harbour, creosoted by Mr. Bethell, is equally satisfactory.

THE NEW ACT ON GOVERNMENT ANNUITIES.—This Act has been issued. Annuities may now be granted up to 50*l.*, and may be paid for in smaller instalments and at shorter periods than hitherto. An assurance on death is not to be entered into for or on behalf of a person under 16 or over 60; and is not to be for more than 100*l.* or less than 20*l.* The Act is not to come into force until tables made in pursuance thereof can be legally acted upon.

PARLIAMENTARY.

Office of Works.—Public Recreation Grounds.—Mr. Doulton gave notice that next session he would call attention to the organisation of the Office of Works, and would move that the consolidation of the several branches of the public service, in relation to architecture, art, and science, should replace the present anomalous and inconvenient arrangements. He also gave notice that he would move for a select committee to inquire into the open spaces within the metropolitan district, with a view to prevent their enclosure.

Tenders for Works at Windsor Castle.—In answer to Mr. Vansittart, Mr. Cowper said, certain alterations had been made as to the reception of tenders for these works, with the view of promoting economy; but those alterations would not in any degree exclude the tradesmen in Windsor, who had hitherto done this sort of work, from still sending in tenders.

Park Lane.—In answer to Sir J. Shelley, Mr. Cowper said, he was very glad that the Metropolitan Board of Works had taken into their consideration the crowded traffic of Park-lane, with a view of remedying it. They proposed, however, that Hamilton-place should be opened for that purpose, instead of adopting what he thought a better plan, viz., widening Park-lane. Hamilton-place was under a lease from the Crown, and that lease could not be broken, but the advisers of the Crown would not oppose a prolongation of Hamilton-place if the Metropolitan Board of Works should desire that.

The Serpentine.—In answer to Mr. H. Lewis, Mr. Cowper said it would be dangerous in the present hot weather to meddle with the Serpentine, but it would be cleansed in the cold weather.

CONTINENTAL NEWS.

Hamburg.—The want of a zoological garden has long been felt by the inhabitants of this city, especially as the connexions of our merchant princes with all parts of the world seemed to facilitate its establishment. At last, about a year and a half ago, some fifty influential gentlemen met at a dinner, speeches were made, and subscription lists were handed round—*tout comme chez nous:* Most of the subscriptions consisted of *animals*, one gentleman signing for a couple of lions, another for a bear, a third for a monkey-house, &c; and in less than a year Hamburg could boast of a well-stocked zoological establishment. Amongst the latest additions is a large aquarium, constructed from the plans of Messrs. Meuron & Haller, architects, who were guided by the advice of Mr. W. Alford Lloyd, aquarium manufacturer, of London. This building is 64 ft. long by 34 ft. broad: the floor is 10 ft. below ground level, and is reached by two flights of steps, 10 ft. wide. The interior is divided into what may be called a nave and two side aisles, 9 ft. wide, the latter being roofed in with glass, similar to hot-houses, each containing five aquaria. The sides of these aquaria are of slate slabs, 2½ in. and 2 in. thick, the sides next spectator being of glass, 1 in. and ¾ in. thick. The central division, or nave, is 16 ft. high, and is lighted only by means of the rays of the sun passing through the aquaria on either side. The effect of this arrangement is, that all the light is thrown upon the specimen cases, the spectator remaining in half light. The arrangement for lighting the building by night is similar, argand burners throwing no shadows, and reflectors being fixed near the surface of the water. A hot-water apparatus, and diverse contrivances for ventilation and for keeping the building at an even temperature throughout the year, complete this novel arrangement.——The new Museum of Fine Arts is shortly to be begun, tenders for masons', joiners', and carpenters' work being advertised for in the local journals. The architect is Mr. F. Laeisz.

Bremen—is to have a new exchange, the building to contain a large hall, reading-rooms, telegraph offices, &c.

Leipzig.—The idea of testifying to Herr von Beust the satisfaction of all Germany, for the manner in which he represented the Diet at the late conference in London, found little favour at the time; but now the matter has again been taken up, and subscriptions are being raised. Already some 5,000*l.* are at the disposal of the committee, and it is probable that a villa, beautifully situate on the banks of the Elbe, just completed, and now for sale, will be purchased and presented to him.

Cologne.—This city is just now celebrating a great church festival, the 500th anniversary of the arrival of the bones of the Three Magi. These relics are supposed to have reposed at Milan for centuries, and when Frederick Barbarossa conquered and destroyed that city, Archbishop Reinold, of Cologne, obtained the remains as his share of booty, and sent them to his native city, where they arrived on the 23rd July, 1164. Many of our readers have, doubtless, seen the costly shrine in which the relics are preserved. If we remember rightly the *skulls* of the Three Magi are preserved at Venice.

Hanover.—A decree, dated June, 1861, ordered the construction of a "Royal Guelphic Museum," to contain collections of antiquities belonging to the Ducal (now Royal) House of the Guelphs, and to the countries ruled by them. Already this Museum possesses a degree of interest hardly to be expected in so short a time. There are collections of armour, and implements of war and the chase; an array of costumes, some belonging to the middle of the sixteenth century; cases of jewelry, formerly in the possession of the House of Brunswick-Luneburg; collections of glasses, silver drinking-cups, and quaint musical instruments, &c. There is a curious display of instruments of torture, formerly used,—the last as late as 1818, when a man was cruelly ill-used for stealing a horse. The coins are interesting, and there is a complete series of English money, beginning with that of the time of George I. Not the least interesting is some church plate brought by Henry the Lion from Palestine in the twelfth century.

Athens.—The Austrian Consul, Dr. von Hahn, has sent a detailed and interesting paper to the President of the Austrian Geological Institute, Hofrath von Haidinger, giving an account of his recent excavations at Troy. With only thirty-six workmen at his disposal, he succeeded, between the 29th of April and 21st of May, in opening up the entire extent of the fort on the Balidagh, and discovered many "cyclopian" walls. Sculpture there was none; but Dr. von Hahn collected some Greek coins, lamps, and figures in burnt clay.

FROM SCOTLAND.

Edinburgh.—The Edinburgh and Leith Sewerage Bill has now passed, with a few unimportant amendments, which we reagreed to by the Commons.

Dumfries.—The "Apostolic" or Irvingite congregation have resolved to erect a more commodious and elegant place of worship. The site is in Mr. Learmont's nursery, on the north side of the New-road, near the theatre. "The plan of the building," says the *Dumfries Courier*, "is the same as that of the new Episcopal Church at Dunse,—architectural designs not being copyright,—with the addition of another vestry. It is in the Norman style of architecture. The building will consist of nave, with side aisles and chancel. The entire length will be 64 ft., and the width 40 ft. The elevation to the New-road will be about 34 ft. in height, with a tower and spire at the east side. The line of front is broken, the centre or nave projecting beyond the west aisle, while the tower is in advance of the nave. The entrance is by the tower. In the gable front of the nave there is a large wheel window in eight compartments, and a large window below in two compartments. At the north gable the chancel projects about 12 ft. beyond the east aisle, and on the west side of the chancel are a large and a small vestry. In the interior the side walls are supported by four columns and arches, dividing the aisles from the nave. There will be four windows in each aisle, four clerestory windows in the upper part of the nave, and a large three-mullioned window in the chancel. At the south end of the nave there is an organ-gallery above the entrance lobby, the access to which will be by a stair in the tower. The building material is red freestone, dressed in 'blocker' work,—hewn with a narrow chisel. The interior walls will be the same as the exterior, there being no plaster work. The columns of the aisles will be polished, with carved capitals. The church will accommodate fully 200. The contractors are Mr. Joseph Watret for masonwork; and Mr. John Mein for joiner, slater, plumber-work, &c. The cost, we believe, will be fully 1,000*l.*"——In St. Andrew's Roman Catholic Church, an improvement is nearly completed by the whole of the windows being filled in with mullions in the Gothic style, executed by Mr. J. Flint. The windows have been refilled with stained glass, executed by Mr. F. Barnet, Leith. The groundwork of the windows is a geometrical design, and in each of the windows in the body of the building there are two panels, with the representations of saints. The first window from the altar on the south side contains Saints Winefreda and Francisca Xaverius; the second, Saints Robert and Helena; the third, Saints Andrew and Margaret; and the fourth St. John the Baptist and St. Elizabeth. On the north side, the first window from the altar contains Saints James and John; the second, Saints Joseph and Mary, with the infant Jesus; the third, Saints William and Helen; and the fourth, Saints Patrick and Bridget. The two windows in the front on each side of the tower, have also been erected by the congregation: they do not contain panels.

Arbroath.—The seven wells erected in the Townhead district, for the Townhead water supply, has been set in operation. The water, it is said, has every appearance of being plentiful, and the quality excellent. This water has been got in the Montrose Turnpike-road, which abounds with spring-water. The bottom of the reservoir is 8 ft. from the surface of the road, and is 45 ft. long, 5 ft. wide, and 4½ ft. in depth. At this depth the water is abundant. The total quantity which could now be drawn from the reservoir is upwards of twenty gallons per minute. An eighth well is in contemplation. The expense of the whole scheme will be about 200*l.*

CHURCH-BUILDING NEWS.

Gainsborough.—The sum of 500*l.* having been subscribed for the Gainsborough parish church alterations, it has been resolved that an application should be made forthwith for a faculty for re-building the north and south galleries, and carrying out the other improvements contemplated, including the warming of the edifice. The portion of the south gallery occupied by Sir Hickman Bacon, bart., is not, however, to be taken down or altered in any way without his written consent having been first obtained. Meantime the alterations in the church have been commenced. The joists under the floor are found to be very much decayed, and another 100*l.* or more will be required on this account. Mr. A. Allen, of Newark, is the architect; and Mr. Cant, of Gainsborough, the contractor.

Huddersfield.—St. Stephen's Church, Rashcliffe, has been consecrated. The edifice has been erected at a cost of about 2,300*l.* from plans prepared by Messrs. Blackmoor & Withers, of Sheffield.

Westow.—The church here, which is situate about a mile and a half from Kirkham, on the York and Scarborough Railway, has lately been restored, and re-opened for Divine service. The new church consists of a nave and north aisle, 50 ft. long and 21 ft. and 12½ ft. wide respectively. The chancel is of nearly the same dimensions as the old one, with a vestry on the north side. A south porch on the site of the old one gives access to the body of the church. The church walls have been rebuilt, to a great extent, with the old materials. There are simple windows of two lights in the north and south walls, with tracery in the heads, and a three-light in the west wall of the north aisle. The roofs are high pitched (as near the original as can be ascertained), and covered with Westmoreland slate, while stone crosses surmount the various gables. The interior of the church is of simple and unadorned character. The nave is divided from the north aisle by an arcade of four arches springing from circular columns. The chancel arch is of rather more ornamental character, resting on corbel shafts with foliaged caps. The walls are lined with rubble stone from neighbouring quarries. The windows are filled with cathedral glass, excepting the east and north, which are painted. The roofs internally are open to the ridge, boarded, and stained. The seats are of wainscot oak, and of low height, and open accommodation for about 400 is provided. With the exception of the chancel, which has been restored under the superintendence of the Ecclesiastical Commissioners, the whole of the alterations have been designed by Messrs. Mallinson & Healey, of Bradford. The east window is of stained glass, and was supplied by Mr. Wailes, of Newcastle, at the cost of 150*l.* The subjects are, Christ entering the House of Mary and Martha after the Death of Lazarus; Christ raising Lazarus; Jesus weeping; Jews coming from Jerusalem to comfort the Sisters concerning Lazarus; the two Sisters ministering to Lazarus

when sick; and Mary kneeling at the Feet of Jesus. The west window, which represents the Transfiguration, was supplied by Mr. Knowles, of York. Exclusive of the windows, the restoration of the nave has cost 1,000*l.*, and the chancel 300*l.*

Tockwith.—The foundation stone of a new church has been laid at Tockwith, near Wetherby. The edifice is to be built in the Early Decorated Gothic style, and will consist of a nave 6 ft. by 22 ft.; north and south transepts, 14½ ft. by 17½ ft.; chancel, 32 ft. by 21 ft.; organ chamber and vestry on the south side of the chancel, porch on the westernmost bay of the nave and circular bell-turret on the north-east corner of the nave. It will accommodate 244 adults and fifty-six children, and the total cost will probably amount to 3,000*l.* The architects are Messrs. Mallinson & Healey, of Bradford and Halifax; and the contractors, Messrs. Ridsdale, masons, Starbeck, and Messrs. Whitfield & Son, joiners, Wetherby.

Crayke (*Yorkshire*).—The church at Crayke, near Easingwold, has been recently restored and enlarged, and is now re-opened for divine worship. The superintendence of the restoration was placed in the hands of Mr. E. G. Paley, of Lancaster, architect, and according to the plans which he prepared workmen commenced operations in the spring of last year. It was then ascertained that the rafters of the roof were in many instances decayed at the ends, although sound in other respects. It was felt that the roof ought, if possible, to be preserved, and this has been accomplished. The old and new wood, of which the timbers consist, are dovetailed together, and secured by iron plates fastened upon each side. The flooring was in a bad condition, and has been removed. The aisles are now laid with flagging, whilst that portion of the area of the church devoted to sittings has a covering of thick boards, underneath which is a hollow space to prevent damp. The oak pews have been replaced by low uniform sittings. The wall of the new aisles contains three windows of two lights each. At the east end of it is a three-light window, and at the western termination is a window of two lights. The whole of these are filled in with cathedral glass. The cost of the restoration has been about 1,000*l.* Of this an outlay of 750*l.* has been incurred in the erection of the new aisle by Archdeacon Churton, the rector. The contractor was Mr. J. Brown, carpenter and joiner. He sublet the masonry to Mr. Grange; the glazing, to Messrs. Hodgson; and the staining of the seats, to Messrs. Harker & Dodsworth, all of York.

Staveley (*Yorkshire*).—The church here has been consecrated by the Bishop of Ripon, and is of the Early English style, with nave; tower and spire at west end, open through to nave, with large arch, chancel, organ-chamber, and vestry at the north side of same. The roofs are of high pitch with open framed principals, with slates of varied tints in alternate bands. The stalls in chancel are of English oak, richly carved. The pulpit and font are of Caen stone. The seats throughout are of pitch pine, with accommodation for 230 persons. The chancel is laid with encaustic tiles. Several of the windows in nave are filled with richly-coloured stained glass by Ward & Hughes, of London, and Edmundson & Son, of Manchester. The altar-rail is of brass, by Skidmore, of Coventry. The total cost will be about 2,000*l.* and all the works have been done by Mr. Freeman, builder, of Staveley, from the designs and superintendence of Mr. John Lowe, architect, of Manchester.

Hawthorn.—The Bishop of Durham has just consecrated a new church, erected at the sole expense of Mr. R. L. Pemberton, at the village of Hawthorn, almost midway between Seaham Harbour and Easington. When the living of Easington was divided, a short time ago, Mr. Pemberton, who owns the whole of the land in that district, built a parsonage-house. He also erected schools for the use of the villagers, and those for a time served as a temporary church.

Blyth.—A new church has been consecrated by the Bishop of Durham, at Waterloo, near Blyth. The edifice, which is of Early Pointed architecture, consists, at present, of a nave and short chancel. It is intended, hereafter, to extend the chancel, to erect a tower, and to build a broad aisle on the north side. The east and west windows are each of three lancet-lights under an enclosing arch, with crisped circles under it. The side windows are of two lights and similar character. There is a porch at the south-western angle of the nave. A temporary vestry is built on the north side. The roofs are open-framed; the timbers dressed and stained, with ceiling between the spars, and a space between the ceiling; and slates to obviate down-draught in the church. The seats in the nave are all low, open, and uniform; those in the chancel somewhat ornamental. An organ, by Nicholson, of Newcastle, is placed in the south-east corner of the nave. The church will accommodate nearly 300 persons, all free. Messrs. Austin & Johnson, of Newcastle, were the architects; and the builders were Messrs. Burn & White, of Blyth and Morpeth. The cost of the edifice has been 1,600*l.*, one-half defrayed by a family in the neighbourhood, who also gave the site.

Scotby (*Carlisle*).—The foundation stone of a new parsonage-house for the incumbent has been laid at Scotby, on a site on Swine-hill, at the Carlisle end of the village. Mr. David Hodgson gives the site and a donation besides. Mr. D. Birkett, of Carlisle, is the architect of the building, which will be in the Gothic style. It is to be built of the red sandstone of the district, the cost being about 1,200*l.* Messrs. Brough & Dodd are the contractors.

Gateshead.—The foundation stone of a new church, connected with the Church of England, in Gateshead, has been laid by Lady James, who is also the chief contributor towards the building. The site is in the east part of the borough. The church will comprise a chancel 31 ft. 6 in. long by 29 ft. wide, with organ chamber and vestry on the north side; a nave 71 ft. 6 in. long by 29 ft. wide; and a north aisle 72 ft. long by 12 ft. wide. The height to the ridge of the nave roof will be about 53 ft. Arches will be built into the south wall of the nave to facilitate the addition of a south aisle. The accommodation now provided is in all 540 sittings. The style is Transition. The main walls are 3 ft. thick, and the timbers of the roof of considerable dimensions. The walls will be constructed externally of snecked rubble, and will not be plastered on the inside. The roofs will be open-timbered, and ceiled between the spars.

Tonbridge.—We are requested to state that the sum of 650*l.* for the Union Chapel included architect's commission, &c.; and that the builder was Mr. Constable, of Penshurst. The building has been erected for the performance of the services of the Church of England.

DISSENTING CHURCH BUILDING NEWS.

Montgomery.—The new Wesleyan Chapel here has been opened for divine service. It was built from a design by Mr. White, architect, of London, under the superintendence of Mr. Potter, of Welshpool; Mr. L. E. Evans, of Montgomery, being the builder. The structure is in the Gothic style with a turret. The edifice is situate below the ruins of the old castle of Montgomery, and in the entrance to the town.

Willenhall.—The Wesleyan chapel has been re-opened. The building has been enlarged by extension backwards, and by transeptal projections in the sides, by which means some 250 additional sittings for adults have been obtained. The front has been remodelled, and now includes two staircase towers at the corners, surmounted by domes, with new pediments, new vestibule, &c. The style adopted is Greco-Roman, the lower part being of the Doric order, and the upper part of the Corinthian. The interior has been altered by the introduction of a series of large arches, and corresponding recesses at the communion end, by new cornices and other ornaments in the ceiling. The ground floor has been repewed, and a new pulpit erected. At the east end, over the communion, there is a large window of three semicircular-headed lights, filled in with stained glass. In the middle light is a figure of the Saviour, surmounted by a cross, with the inscription underneath:—"My kingdom is not of this world." The figure is placed under a canopy, supported by a base on which is the representation of a lamb illustrated in the text, "Behold the Lamb of God." Forming the apex of the canopy is the "Pelican of Piety." The whole is surrounded by a border. In the side lights are the emblems of the Trinity and the Holy Ghost, surrounded by a light border, and enriched by a gold stain, with monograms inscribed above and beneath, and also surrounded, like the centre light, with a border. The window was designed by Mr. T. W. Carm, and has been executed by Messrs. Chance, of West Bromwich. The night lighting is effected by three large star lights in the main ceiling, and by brackets under the galleries. The whole of the alterations have been carried out from the designs of Mr. E. Banks, of Wolverhampton, architect. The contractor was Mr. Job Wilkes, of Darlaston. The total expense incurred is about 1,500*l.*, towards which upwards of 900*l.* has already been raised and promised.

Rosedale (*Yorkshire*).—Some months ago the foundation-stone of a new Wesleyan chapel was laid here by Mr. A. C. Sheriff, of Worcester. This chapel is now completed, and has been opened for public worship. The building is of Gothic character, without much ornament. The inside measure is 40 ft. by 32 ft., and affords sittings for 250 persons. The edifice is built of local stone, pitch faced, and laid in level courses, with tooled dressings, and relieved by bands and arches of a darker coloured stone. The roof is in one span, ceiled at the collar-beams, which, together with the principals, purlins, and ceiling binders, are exposed, and stained and varnished. The pews are framed of Petersburg red deal, with solid bench ends, and stained and varnished. The contractors for the mason's, slater's, and plasterer's work were Messrs. Wood, of Pickering; for the carpenter's and joiner's work, Mr. W. Bulmer, of Scarborough; for the plumber's, glazier's, ironfounder's, and painter's works, Mr. Whitelock, of Pickering. The whole of the works have been carried out under the superintendence of Mr. Watson, of Wakefield, the architect. The cost, exclusive of boundaries, is about 500*l.*

Books Received.

A Series of Metric Tables. By CHARLES H. DOWLING, C.E. London: Lockwood & Co. 1864.

IN this series of metric tables, prepared by Mr. Dowling, the British standard measures and weights are compared with those of the metric system at present in use on the Continent. They are intended to facilitate the conversion of the one into the other in both ways,—British into Metric and Metric into British; and are therefore capable of rendering important service to all engaged with continental countries in commercial, manufacturing, or mechanical transactions. They were originally calculated for the author's own use, while professionally engaged on the Continent; and it appears from the preface that their accuracy has been certified by Professor Airy, the Astronomer Royal, a very high authority on such a subject.

VARIORUM.

"On certain Results and Defects of the Reports of the Registrar-General; from the Journal of the Statistical Society of London; June, 1864." The author of this paper is Mr. W. L. Sargant. One of his principal conclusions is thus stated:—

"Comparing the last decennial period (1851-60) with the previous one (1841-50), the improvement in the rate of mortality is very small, and is far from fulfilling the expectations of sanitary reformers [p. 175]. The excess of mortality in towns as compared with that of rural districts, is an evil too deeply seated to be corrected by improved drainage and water-supply [p. 177]."

Now, we deny either that the expectations of sanitary reformers have been disappointed with the results of drainage and water supply in towns, or that they look to drainage and water supply alone to produce all that is desired in sanitary reform. Both are essential, and cannot be neglected with impunity, though Mr. Sargant would seem to imply that they can; but so long as want of ventilation, over-crowding, and dirt, prevail in the interior of dwellings, the requirements of sanitary reformers are not by any means fulfilled. Nevertheless, the local and special reports, which have been published by scores, on the subject, show clearly that wherever drainage and water supply have been improved, there mortality has markedly diminished; and if the Registrar-General's reports show this improvement to be as yet what Mr. Sargant calls "very small," that can only show how much is yet to be done throughout the whole country in the case of even drainage and water supply, far less in regard to ventilation, overcrowding, and dirty habits. The continued efforts of sanitary reformers have already produced a decided and very general public opinion in favour of both drainage and water supply; and it is mainly by the formation of a similar public opinion in favour of ventilation and cleanly habits, and against overcrowding, that they hope to fulfil their expecta-

tions.——"Report of a Discussion on the proposed Admission of Girls to the University local Examinations. London: Emily Faithfull. 1864." This pamphlet is published under the auspices of the National Association for the Promotion of Social Science, with which is united the Society for Promoting the Amendment of the Law. It shows the result of an experiment with regard to the local examination of girls, by comparison with those of boys,—a result which is considered sufficiently favourable to induce those interested in it to make further exertions towards the realization of the object in view.——The *Quarterly* has an interesting paper on "Christian Art," founded on Lady Eastlake's "History of Our Lord," of which book, by the way, we owe our readers an account, and will not long delay payment. The *Quarterly* writer dwells at considerable length on the Art of the Catacombs. An article in the same periodical, on "Travelling in England," will also interest many of our readers.

Miscellanea.

ARCHÆOLOGICAL INSTITUTE.—The congress has been opened satisfactorily in Warwick, and several excursions, in accordance with the programme we gave, have been made.

PROPOSED RESTORATION OF ST. BARTHOLOMEW'S, SMITHFIELD.—We learn from the newspapers that a committee of architects have met and have sanctioned the plans laid before the Restoration Committee, and that the works will be shortly commenced.

DEMOLITION OF AN ANCIENT HOUSE IN LONDON.—In the centre of a block of houses on the west side of St. Mary-axe, and only a few doors from Leadenhall-street, stood an edifice of quaint appearance, being constructed of wood with overhanging bay windows, except those on the attic or fourth floor, which was evidently of more modern construction than the rest of the building. Its date has been lost in the lapse of years. This relic of old London has recently been pulled down.

RESTORING OIL PAINTINGS. — A remarkable process for restoring old oil pictures by submitting them to the vapour of alcohol has, it is said, been perfected by a German *savant* (Herr Pettenkoffer), who thus restores them without any real chemical action and without touching them at all. His process professes to be mechanical, and merely to replace the losses which age and desiccation have produced, and to restore the original brilliancy of the pictures by a process which is simple and effectual, and yet perfectly safe. In this view the blackness on old pictures must be supposed not at all to arise from smoke or dirt on the varnish.

MONUMENTAL.—To Mr. Shirley Brooks belongs the credit of organising a committee, numbering some of the best known names in literature and art, for the purpose of erecting a memorial to the late Mr. Thackeray in Westminster Abbey. The consent of the dean has been obtained, and when the subscriptions flow in, a meeting will be held to decide what form the memorial shall take. —— An influential committee has been formed in London to raise a memorial to the late Mr. W. J. Fox, and a considerable sum has been already subscribed towards the fund for this object. The committee propose to employ the amount obtained in erecting a monument over the grave of Fox, in placing a marble copy of Mr. Earle's bust of the deceased in the National Portrait Gallery, and issuing an edition of his works.

THE STRIKE AMONGST THE FLINT GLASS MAKERS.—A fortnight ago a meeting of masters and delegates connected with the flint glass trade was held at the Old George, Bridge-gate, Leeds, to consider the advance asked for by the men. The chair was taken by Mr. S. Blunn, of Catcliffe. A fair and impartial consideration of the question having been invited, the representative of the masters drew attention to the keen competition at present existing between the English and foreign manufacturers, and argued that at present the masters were not in a position to grant the advance asked for. Mr. Leicester replied on behalf of the delegates, contending that the 15 per cent. advance asked for was neither unreasonable nor exorbitant. The masters unanimously agreed to give the advance asked for. The men withdrew their notices, and resumed work.

IMPROVED CABS.—It is proposed to establish a new patent carriage company upon rather improved principles to the Hansom cab. A great deal of improvement is needed in all the London public vehicles, and certainly a better cab than the hansom is required, which is inconvenient to enter at the side, provides an awkward prospect, and has the knack of getting into innumerable difficulties. The writer of this has twice seen the cabman pitched right over the horse when it stumbled, and only last week saw a passenger thrown out head foremost into the street.

SCULPTURE BY ELECTRIC LIGHT.—Persons who passed the gardens of Apsley House a few nights ago were at a loss to understand the varicoloured lights which flashed here and there and filled the trees with radiance. The fact is, a number of works of sculpture were being exhibited by electric light to the guests of the Duke of Wellington. This was effected by large voltaic batteries arranged on Grove's principle, which were connected with lamps and parabolic reflectors, constructed by M. Serrin, of Paris. The colours applied were shades of red, amber, blue, green, and white.

ORNAMENTAL TIMBER.—The Lords Justices, in the recent case of *Forde* v. *Tynte*, decided that the question what "a prudent owner" would do in the proper or ordinary course of management can be no measure of the obligation which attaches in the Court of Chancery upon a tenant for life without impeachment of waste, with reference to timber planted or left standing for ornament; for every such tenant for life is bound by the taste or want of taste of any absolute owner by whom the timber may have been so planted or left standing: he is not owner, for any beneficial purpose, of timber absolutely and entirely so dedicated.

HAVELOCK'S TOMB.—A correspondent of the *Bengal Hurkaru*, who lately passed through Oude, gives this sad account of the present condition of Havelock's tomb:—"I reached the Alumbagh about five a.m., and could not pass without visiting the grave of Havelock. I was much surprised and disappointed to find the place utterly neglected. It might be as well, perhaps, to leave the house as it now stands, for it bears good evidence of the fighting there; but why the garden should be allowed to remain as it is cannot very well be explained. One thousand rupees expended on the garden in clearing it out and planting shrubs, and fifty rupees per month afterwards, would, I think, do all that is necessary."

THE PUBLIC WORKS ACT.—In reference to the Lancashire Public Works Act, it appears that of the loans ordered, amounting to a million and a half, only 426,000*l.* have been yet advanced. The great bulk of the expenditure has been for sewerage and street improvement works, including the formation and paving of streets. The length of the sewerage works thus undertaken is 263 miles. The area of paving and street works undertaken in respect of the above-mentioned sum is 683 acres, the length of the streets and roads made being 253 miles. The tables include almost every township of importance in the cotton manufacturing districts, there being but few which have not undertaken public works through the provisions of this Act. The health and strength of the distressed operatives have been greatly improved since their employment on these public works.

PROPOSED WORKING WOMEN'S COLLEGE.—A prospectus for the formation of a working women's college has been issued. It is intended to take as a model the Working Men's College, in Great Ormond-street, in which the principle of mutual help and brotherhood between those in different social positions has been successfully carried out. There will be in many subjects both elementary and advanced classes, taught by ladies and gentlemen experienced in teaching, and also preparatory classes in reading, writing, and arithmetic, in order to render students eligible to join the elementary classes. The fees will be very small. A coffee-room will be provided, with periodicals, newspapers, &c., and will be open every evening from seven to ten o'clock, and be made as far as possible (under proper regulations), the centre of the social life of the college. It is proposed to rent a house in some central situation—say, near either Fitzroy-square or Soho-square—and to begin with some preparatory classes as soon as possible, with a view to the college itself being regularly opened in October next.

HALIFAX TOWN HALL.—A marble bust of the Queen has just been erected in the Halifax Town Hall. It is a gift to the corporation from the ex-mayor, Mr. John Crossley, and is a companion bust to that of the Prince Consort, presented by the present mayor, Major Holdsworth.

PLÖN CHURCH DESTROYED BY LIGHTNING.—The fine old parish church of Plön was destroyed by fire on the 24th ult. The tower was struck by lightning; but it was not until two hours afterwards that the fire became apparent by the flames suddenly bursting out from end to end of the church. In three-quarters of an hour all was over.

NEW THEATRE AND OPERA-HOUSE FOR LIVERPOOL.—A limited liability company, the directors of which include some of the most influential and wealthy "merchant princes" of Liverpool, have purchased a plot of ground in Lime-street, Liverpool, near the London and North-Western Railway Station, and opposite St. George's Hall, on which they are about to erect a theatre and opera-house. It is expected that the new building will be opened before next Christmas, though it is to be a very large structure, combining all the recent improvements. Especial attention will be paid to ventilation and to the comfort of the audience; for, though the theatre will be a large one, it is only intended to seat 1,500 persons. The building is to be called the Alexandra Theatre and Opera-House.

NEW METHOD OF ILLUMINATION.—M. Subra, professor of mathematics, says the *American Gas-Light Journal*, has invented a new method of illumination, or rather a method of inverting a flame, by the adoption of which several advantages are expected to be realized. The apparatus consists of a syphon of glass, the open ends of which are turned upwards; a burner is placed just within the shorter branch. Before lighting the lamp, the longer branch of the syphon is heated, and a current of air established, which carries with it any flame placed at the open end of the shorter branch, the flame, consequently, becoming inverted. As soon as the current is established, and the burner kindled, the heating of the longer leg may be discontinued; the current, once established, being sustained by the heat from the inverted flame. Thus, the supports of the globes or lamp-glasses are placed above the flame, and do not intercept the light; and the reflectors are in no danger of becoming blackened by smoke. The products of combustion, too, are collected in the syphon, and may be conveyed away, instead of vitiating the air of the apartment. It is proposed to employ these reversed flames as foot-lights for theatres.

OPENING OF NEW CUSTOM HOUSE, SOUTH SHIELDS.—The new Custom-house buildings, South Shields, have been formally opened by the members of the corporation and the River Tyne commissioners. The buildings, which are of the Italian order of architecture, stand on the quay at the Mill Dam, and command an extensive view of the River Tyne, both up and down. The façade next the river is composed of eight Corinthian columns (coupled), standing upon a rusticated basement of piers and arches, forming an arcade. The four centre columns are surmounted by a pediment, in which are placed the Royal arms. The borough arms are likewise placed over the centre arch of the arcade. The flank and back elevations are of a somewhat plainer character. The main cornice and principal string-courses are continued all round, with rusticated basement story in keeping with arcade and moulded quoins at the angles, the whole surmounted by a parapet. The shipping-office is on the ground-floor, and comprises shipping-master's office, 20 ft. by 16 ft.; waiting-room, 20 ft. by 15 ft.; general shipping-office, 26 ft. by 20 ft. The entrance or vestibule to shipping-office is paved with Caithness flags. There is also on the ground-floor a large bonding warehouse, with other rooms. The first floor is set apart for the Custom-house, the entrance to which is by a vestibule 34 ft. in length, and paved with tesselated flags. The Custom-house comprises private office, 20 ft. by 17 ft.; general office, 23 ft. 6 in. by 20 ft.; locker's room, 12 ft. by 13 ft. 6 in.; waiting-room and small office, 20 ft. by 13 ft. 6 in. On this floor also is the Marine Board-room, 25 ft. by 20 ft. The cost of the building is, we understand, 3,000*l.* Mr. T. M. Clemence, the borough surveyor, was the architect, under whose superintendence the buildings were carried out by Messrs. Scott & Suddards, of South Shields, builders.

THE ANTHROPOGLOSSOS. — If this so-called singing-machine had been restricted to a simple song or so, we might have listened quietly, and wondered whether or not we were being deceived; but, singing, as it does, all sorts of songs, and any that may be given to the owner a few hours beforehand, we have no doubt on the subject. How the imposition is managed, unless, indeed, some poor dwarf is actually boxed up in the suspended head, is not obvious; but imposition it must be. This need not prevent people from going to see it,—the question being, how is the affair managed? If, however, it *should* resolve itself into the confinement of a human being within the waxen *caput*, the proprietors should at once be prosecuted for cruelty.

STAINED GLASS COMPETITION.—The Art Department is seeking to obtain for the South Kensington Museum a design for a stained glass window, 18 ft. 9 in. high to the crown of a semicircular arch, by 11 ft. wide. The subject is furnished by the thirty-eighth chapter of Ecclesiasticus. The design is to be on the scale of one inch to the foot, and coloured, and it is to be accompanied by a full-size cartoon of a sufficient portion to show the execution, and a specimen of a portion of the design executed in glass, of the full size, 40*l.* will be awarded for the design which appears to be most suitable, and a sum of 20*l.* for the next best design. The designs to which the prizes are awarded will become the property of the Department, which however does not bind itself to execute either of them. The inducement seems to us scarcely strong enough to insure a good result.

THE COPPER TRADE.—The past fortnight, says a Liverpool report, has been characterised by an active and also speculative demand for both English and foreign copper; and though the smelters have not officially advanced their prices, they have been able to sell pretty freely at 3*l.* advance: 5*l.* are now generally asked. Chili bars have advanced to 89*l.* and 90*l.*, and there is very little Chili ore and regulus to be got under 18*s.* per unit. This change has been produced by the feeling on the part of consumers that copper had reached a price when it was desirable to go pretty freely into stock. In the first five months of the current year the imports of copper ore and regulus have been 36,733 tons, against 42,827 tons in the corresponding period of 1863, and 47,926 tons in the corresponding period of 1862. The value of the copper ore and regulus imported has been as follows since 1853:—1854, 1,236,132*l.*; 1855, 1,433,693*l.*; 1856, 1,929,683*l.*; 1857, 2,157,558*l.*; 1858, 2,138,880*l.*; 1859, 1,812,023*l.*; 1860, 2,211,558*l.*; 1861, 2,008,246*l.*; 1862, 2,631,056*l.*; and 1863, 2,000,473*l.*

ANCIENT BUDDHIST REMAINS.—An interesting collection of ancient Buddhist remains, discovered by Mr. E. Harris at Sultangunge, on the Ganges, while engaged in some engineering operations, has just arrived in England. Among the objects of interest discovered in the ruins excavated (supposed to be a vihár, or Buddhist monastery) is a colossal image of copper, 7 ft. 6 in. in height, weighing upwards of a ton, and supposed to be more than 2,000 years old. There are also several smaller figures, both in stone and in copper, and some baked clay slabs thickly covered with writing, &c., reminding one of the ancient Assyrian practice. The collection is at present placed in the museum of the Royal Asiatic Society, where plans and sections of the excavations have also been deposited.

LINCOLN ARCHITECTURAL SOCIETY.—The annual meeting was held at Nottingham. The proceedings commenced at St. Mary's Church, with divine service, at which the Rev. Canon Brooks officiated. The choir sang a full service, after which the Rev. Prebendary Trollope, the general secretary of the society, delivered an address on the fabric. The members then proceeded to the castle, where the Bishop of Lincoln took the chair, and the mayor and corporation presented an address of welcome. A paper on the subject of "Nottingham Castle" was read by Mr. T. C. Hine, the honorary local secretary. An excursion was then made to Wollaton Hall; and there was an evening meeting, under the presidency of the Bishop of Lincoln, at the Exchange Hall, where the Rev. Prebendary Trollope read a paper on "The Raising of the Royal Standard of War at Nottingham, by King Charles I.;" and other proceedings took place. A collection of paintings and engravings was exhibited in the Exchange Hall, for the purpose of illustrating the Caroline Civil War, which formally commenced at Nottingham.

NORFOLK AND NORWICH ARCHÆOLOGICAL SOCIETY.—The members of this society have just taken their annual excursion. They met at Little Walsingham, and visited Great Walsingham, where a short stay was made, and Mr. L'Estrange read a few explanatory and historical notes on the church. Some little delay was occasioned owing to the keys of the church not being at hand when the party arrived; and this was the case at several other places visited, although a previous intimation of the visit and the time had been forwarded to the different clergymen. Other places visited were Wighton, Burnham Thorpe (the birthplace of Lord Nelson), Burnham Ulph, Burnham Norton (where a paper was read by the Rev. G. W. Minns on the church, &c., and on the priory ruins and the Lady's Well), and North Creake Abbey, the ruins of which were found to be in apparently the last stage of decomposition, huge timber props being necessary to prevent the chief portion from falling down. Here Mr. Carthew read a short paper, and it was agreed that photographs of the ruins should be engraved and published in the Society's journal. The party closed the day and the meeting by returning to Walsingham.

THE LEICESTERSHIRE ARCHITECTURAL SOCIETY. This society, under the patronage of the Lord-Lieutenant of the county and the Lord Bishop of the diocese, held its tenth general annual meeting at Hinckley, on Tuesday in last week. The members and friends of the society assembled in the Corn Exchange, and, after an address from the Rev. Wm. Skirrow, the vicar, as chairman of the local committee, walked in procession to the church, where, after prayers and a voluntary upon the organ, Mr. Bloxam proceeded to point out the architectural features of the structure. From the church the party proceeded to the site of the old castle. At the Corn Exchange in the evening papers were read by Mr. Bloxam, on Merevale Abbey; Ancient Hinckley, by Mr. J. Thompson; and Notes upon Ancient Hosiery, by Mr. T. North, for Mr. J. G. Nichols. On Wednesday morning the visitors went to Mancetter (Lord Curzon's), Merevale (Mr. C. Dugdale's), lunched at Atherstone, and thence went to Sheepy, Orton-on-the-Hill, Troycross, and Gopsall Hall. The meetings and Museum were crowded to excess throughout Tuesday. The Museum, arranged for the occasion, contained a great variety of architectural and antiquarian objects of interest.

TENDERS.

For new wash-house, laundry, &c., at Clerkenwell Workhouse. Mr. W. P. Griffith, architect:—

Gribble	£1,093	0	0
Ramsay	788	16	0
Hall	726	0	0
Yardley (accepted)	699	10	0
Fowler	680	0	0
Terrey	645	0	0

For editors' rooms, Chapterhouse-court, for Religious Tract Society. Mr. W. P. Griffith, architect:—

Ebbage (accepted)	£440	8	9

For new malting, brewery, and beer cellars for Mr. Thomas Crane, Leicester, exclusive of bricks. Mr. Francis E. Drake, architect. Quantities supplied:—

Glover	£455	0	0
Flude	410	0	0
Clifton	407	0	0
Chambers	400	0	0
Bent	365	0	0
Wall & Lee	345	0	0

For the erection of a billiard-room and other offices at Frensham Hall, for Mr. Charles E. Taylor. Messrs. Eggar & Stapley, architects:—

Birch	£475	0	0

For the erection of a villa residence, at Boundstone, near Farnham, for Messrs. J. & S. Fishwick. Messrs. Eggar & Stapley, architects:—

Birch	£2,335	0	0

For three houses at Camberwell. Mr. W. Berriman, architect:—

Marsland & Son	£4,830	0	0
Colls & Son	4,825	0	0
Macey	4,645	0	0
Gammon	4,560	0	0
Tarrant	4,500	0	0
Westropp	4,485	0	0
Thompson	4,435	0	0
Dennis	4,375	0	0
Wills	4,193	0	0
Henshaw	4,138	0	0

Accepted for the restoration of the parish church at Cossington, in the county of Leicester. Messrs. Goddard & Son, architects:—

For stone-mason's, bricklayer's, slater's, and plasterer's work.

Firn	£669	0	0

For carpenter's, joiner's, and ironfounder's work.

Loveday	575	0	0

For plumber and glazier's work.

Hill	56	0	0

For raising Hare-court Chapel, Aldersgate-street. Mr. W. P. Griffith, architect:—

Ebbage (accepted)	£480	0	0

For additions to a house at Upper Norwood. Mr. Sextus Dyball, architect:—

Seymour (accepted)	£508	0	0

For cellars to No. 2, Church-road, Upper Norwood. Mr. S. Dyball, architect:—

Seymour (accepted)	£350	0	0

For alterations and additions to buildings, at Sydenham, for the Sydenham Laundry Company. Mr. S. Dyball, architect. Quantities by Mr. F. Chadwick:—

Seymour	£1,405	0	0
Sims & Marten	1,320	0	0
Buck	1,270	0	0
Littlejohn	1,100	0	0
King, Hipwell, & Co.*	1,047	0	0

* Accepted.

For a pair of houses to be built at Wandsworth. Mr. G. H. Page, architect:—

Bass	£1,150	0	0
Adamson & Sons	885	0	0
Brighten	875	0	0

For house to be built at St. John's Hill, Battersea-rise, Mr. G. H. Page, architect:—

Bass (accepted)	£1,550	0	0

For additions to the Strand Union schools, Edmonton. Mr. W. Lee, architect. Quantities supplied by Messrs. Linsdell & Giffard:—

Cannon	£4,980	0	0
Fish	4,975	0	0
Howard	4,975	0	0
Hall	4,815	0	0
Humphries	4,750	0	0
Maeers	4,690	0	0
Linzell	4,655	0	0
Hill & Keddell	4,530	0	0
Perry & Judson (accepted)	4,485	0	0
Mann	4,233	0	0
Purkiss	4,085	0	0

For the construction of roads and sewers, Clapton Park Estate. Messrs. Hammack & Lambert, surveyors:—

Randell & Co.	£2,932	0	0
Hartland & Bloomfield	1,997	0	0
Reddin	1,870	0	0
Radley	1,869	0	0
Pound	1,799	0	0
Pizzey	1,775	0	0
Porter	1,528	0	0
Potter (accepted)	1,285	0	0
Horn	1,260	0	0

For the erection of a house at Beulah Spa, for Mr. H. Wright. Messrs. Tress & Chambers, architects:—

Brown & Robinson	£2,593	0	0
Brass	2,575	0	0
Macey	2,519	0	0
King, Burton, & Co.	2,356	0	0
Hawkes	2,200	0	0
Piper & Wheeler	2,185	0	0
Conder	2,134	0	0
Newman & Mann	2,112	0	0
Ollidge	2,066	0	0

For building St. Andrew's Church, Canal-road, Kingsland. Messrs. Long & Bond, architects:—

Sanders	£4,150	0	0
Mares	3,900	0	0
Wood	3,713	0	0
Piper & Wheeler	3,450	0	0
Hardiman & Sandon	3,182	0	0

TO CORRESPONDENTS.

TO KEEP STONE WHITE.—A Subscriber says,—I shall feel obliged if any of your readers will inform me of a wash that will keep white stone clean, in place of using the yellow or white clay which we see daubed on door-steps and parapets.

H. J. M., Quebec (*Carte* has been sent as requested).—E. A. G.—G. & Son.—F. R. W. (not necessary).—G. W. (names are not readable).—F. C.—Dr. B.—J. H. (we decline advising on private d'sputes, and on *ex parte* evidence).—W. K.—W. J.—R. P. (useless now).—E. A. D.—C. E. E.—W. & Sons.—Mr. F.—A. W.

We are compelled to decline pointing out books and giving addresses.

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender; not necessarily for publication.

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[ADVERTISEMENT.]

CHURCH, TURRET, and STABLE CLOCKS. J. W. BENSON, having erected steam-power and improved machinery for clock-making, at the manufactory, Ludgate-hill, will be glad to furnish to clergymen, architects, and committees, Estimates and Specifications of every description of Horological Machine, especially cathedral and public clocks, chiming tunes on any number of bells. A descriptive pamphlet on Church Clocks post free for one stamp. Watch and Clock Maker by Warrant of Appointment to H.R.H. the Prince of Wales, and maker of the great clock for the Exhibition, 1862. 33 & 34, Ludgate-hill, E.C. Established 1749.